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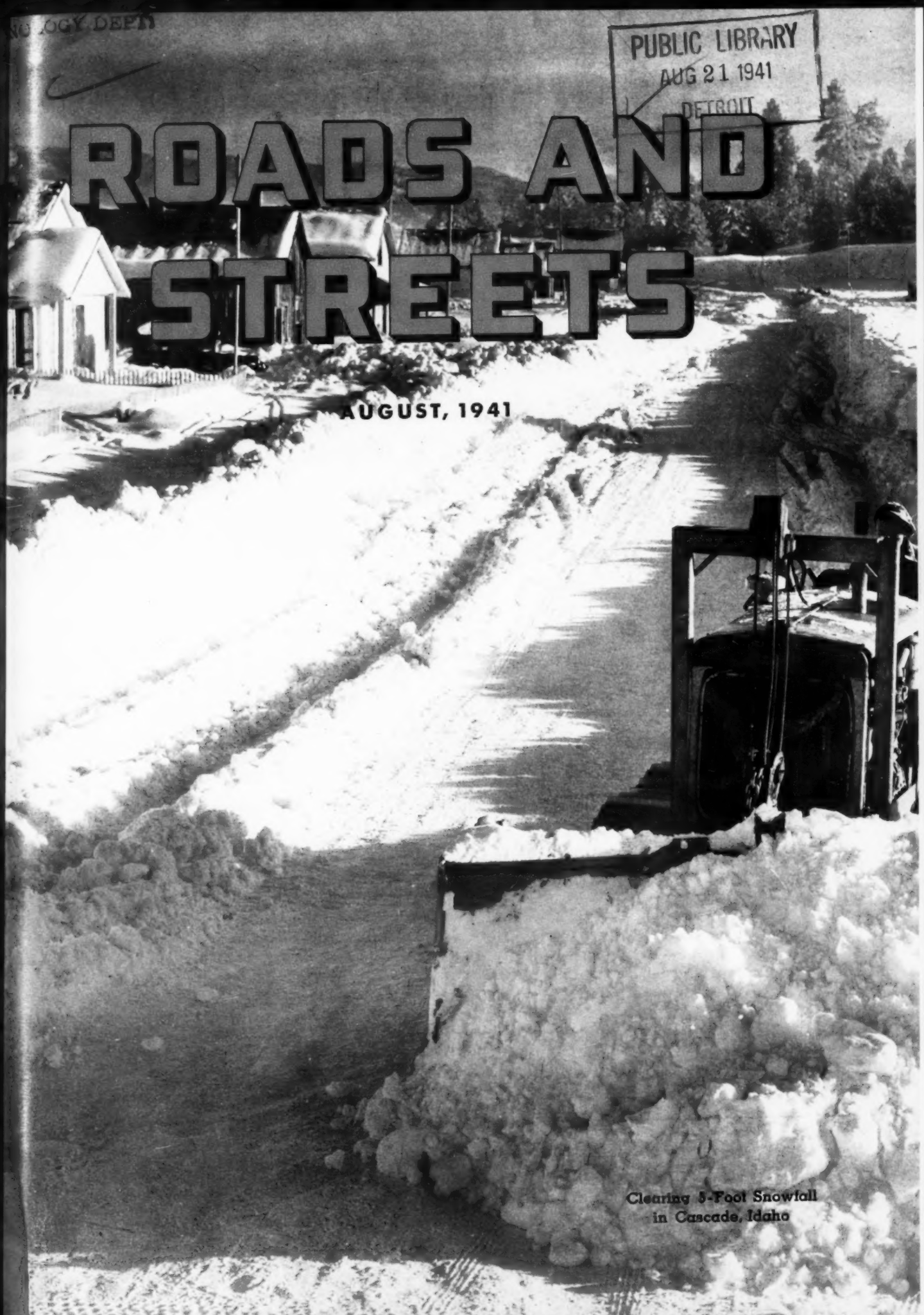

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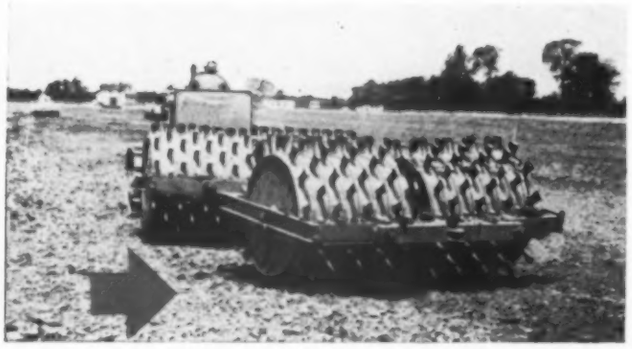

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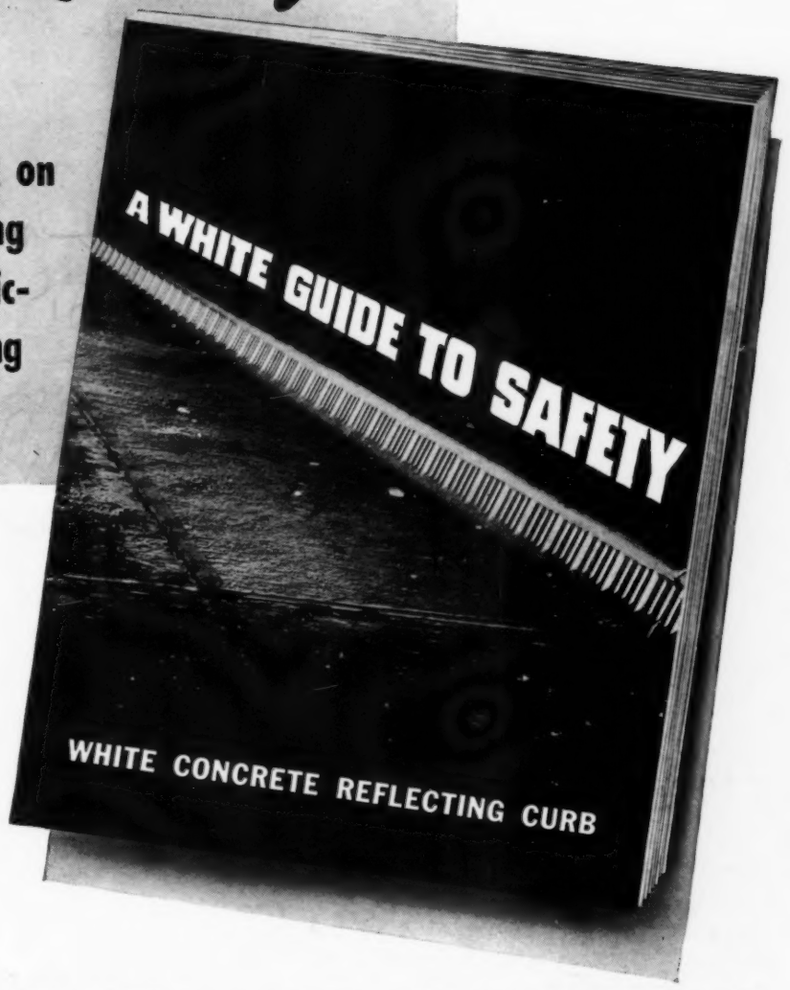

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ROADS and STREETS

Vol. 84, No. 8 August, 1941

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ESTABLISHED 1906

SNOW AND ICE REMOVAL METHODS IN NEW YORK CITY

Detailed Description of Operation of Different Types of Equipment

By LORON G. KURTZ

Director of Motor Equipment and Maintenance
Department of Sanitation—City of New York

THE Department of Sanitation in New York is charged with the cleaning of streets, the collection and removal of refuse, as well as the plowing, piling and removal of snow. Because of the fact that prepared schedules require that all refuse be collected each day, it is necessary that the problem of snow removal be organized and handled as a separate unit, although supervised by the same group of Departmental executives as that for refuse collection. With four thousand miles of streets, heavily traveled at all times of the day and night, the problem of prompt and at the same time economical snow removal assumes quite huge proportions. A ten or twelve inch snowstorm in New York City might require the services of twenty-five to thirty thousand extra emergency employees, in addition to the eleven thousand regular employees. In order that this huge force of men may operate economically and with precision, it is evident that procedures must be most thoroughly understood by executives and that the force as a whole must be well organized and as maneuverable as an army. Every executive and worker must know and appreciate individual responsibility.

Fig. 1.—Snow Broom Mounted on Caterpillar Motor Grader, Operating on the West Side Express Highway

This article* will discuss the following headings:

1. Planning and Preparation.
2. The Importance of Storm Warnings.
3. Snow Plowing and Salt and Sand Spreading.
4. Snow Removal.
5. Equipment.

Planning and Preparation

A definite snow fighting plan for the coming winter begins as soon as this winter season has passed. This

Fig. 2.—Sand Spreader, Including Storage Hoppers, Are Mounted on Truck Chasses. The Hopper-Spreader is Designed as a Unit

plan assumes several phases and consists of, first: thorough inspection of all snow fighting equipment; second: a careful analysis of this year's experience and cost, with particular emphasis on the possibility of improvement, on mechanical lines, as well as of the methods employed; third: preparation of a budget which will take care of the immediate needs in so far as early seasonal expense is concerned. This latter item includes money for salt, sand, tire chains, automotive parts, miscellaneous tools, snow plows, special machines and moneys to be expended on the early storms. This fund is usually made available in September. Needed contracts are then let. Beginning on September 1, each unit of snow fighting apparatus is brought into the Central Motor Repair Shop, where it is given a very rigid inspection and placed in good operating condition. Each snow plow is also repaired and stored in garages at centralized locations. All of this work must be finished and the machines assigned to their respective locations prior to November 15th. Snow can be expected any time from that date.

Paralleling this mechanical preparation program is also a thorough and exhaustive preparation and training schedule of personnel. For the purpose of this personnel training, the Department has established a school at 22nd Street and the East River, which is under the supervision of specially selected competent men who, through years of experience and training, are able to instruct the chauffeurs in more efficient operation of the equipment. Statistics show that a poorly trained or careless operator will do more damage to this automotive equipment in an hour than a skilled man can repair in a day.

This City is normally divided into sixty-one districts. Each district is under the supervision of a District Superintendent. Schedules now being employed by the Department call for the annual training of one garage foreman, an assistant garage foreman and ten of the most competent chauffeurs from each district. At the training school these men are given instruction and practice in the operation of equipment, new methods of procedure, etc. They in turn set up a school of instruction in each district headquarters for the purpose of instructing all other drivers and sweepers holding chauffeurs' licenses. These men are also given as much actual experience in the operation of equipment during their daily work as is possible without disrupting the regular schedules. In addition to this very important part which these men play in the training program, the personnel and equipment regularly assigned to the Training School are designated through the snow period as the Snow Battalion. This Battalion is never broken. It is used at any point in the City where emergency assistance is required for the removal of snow. The work of this particular group has proven so satisfactory in the past that more groups have been formed this year.

Routes Designated.—Snow plowing and removal operations have made it necessary to designate definite snow plow routes, as well as routes for crosswalk plows. As a great deal of the snow is pushed into sewers, the organization of sewering gangs in each area where sewers are available had to be made. Where snow is dumped into the river or at some other disposal point, these locations must be noted and thoroughly understood by the operating organization.

Other Important Items.—The following items are important:

1. Privately owned railways are responsible for removing the snow from their particular area. Proper agreements have to be made to that effect:
2. Issuance of permits to railroad and bus companies for the use of brooms, sand spreads, etc.;
3. Agreements have to be prepared for the hire of privately owned trucks for such time as this additional equipment is necessary for the removal of snow and refuse;
4. The selection of emergency auto truck drivers, temporary auto enginemen, loading and dumping foremen from the list issued by the Civil Service Commission must be made;
5. Making necessary arrangements for the use of personnel and equipment operated by the respective Borough Presidents;
6. The establishment of truck measuring units and selection of the personnel to be employed for such measurements;

Fig. 3.—Typical Cross-Walk Plow Used by the City of New York

*Abstracted from paper presented before 38th Annual Convention, American Road Builders' Association.

Fig. 6.—Buckeye Fine Grader Digs Packed Snow Off of Street Surface

7. Scheduled points for the use of water hydrants;
8. Arrangements for the use of docks to be used as waterfront dumps;
9. Complete listings of sewers to be used for the disposal of snow;
10. Registration of emergency laborers according to the quota in each section of each district;
11. Prescheduled charts for the transportation of paymasters for all emergency laborers;
12. Co-ordination of the department Bureau of Inspection with the Police Department for the regulation of traffic and general police supervision;
13. Preparation of overtime pay rolls.
14. Cost charts of overtime pay rates for the entire personnel;
15. General orders governing actions of personnel and equipment, and last, but not least, the distribution of equipment and necessary supplies.

In a heavy storm, the Department does not begin to have enough equipment to remove all the snow within a reasonable length of time. To augment this force, privately owned trucks are hired for the purpose of loading snow under the Department's snow loaders. Arrangements are also made with outside contractors for the removal of snow in certain specified areas at a fixed bid price. This price is determined by regular procedure after advertising for bids. The contractors who comply with all the requirements set up in the specification and who submit the lowest bid per cubic yard are awarded these contracts. These contractors are only called into operation if the snowfall is sufficiently heavy to make it impossible to be handled by the Department's own forces and equipment.

Weather Forecasts

Prompt and speedy action with a thoroughly organized force is vitally important at the beginning of any storm. Experience has proven that a few hours' delay might mean that with a succession of storms or a sudden freeze-up, vehicular traffic will be tied up in such a manner that it might have serious consequences in its menace to health; the fighting of fires or the transportation of merchandise. For that reason great stress is laid upon obtaining the best information possible on prevailing weather conditions with special emphasis on storm warnings. It is true that, especially in New York, the trend or path of a storm may change entirely on a few hours' notice. In order to have the equipment in readiness and the men posted as accurately as possible, full advantage is taken of the information available at the United States Weather Bureau, as well as periodic reports from airline headquarters at La Guardia Field. Information received from the various airlines is available in determining just when a storm will hit and when used in connection with a map from the United States Weather Bureau, a fairly accurate idea of the storm's intensity can be determined. The field forces are constantly being informed as to conditions through the medium of the teletype system which is installed in the Central Office at 125 Worth Street and over which orders are simultaneously passed to each District Office in the five Boroughs, each Borough Superintendent's office and the Central Motor Repair Shop. This method assures officials that every order is received promptly and that each is identical in every Borough of the city.

Snow Plowing

For the purpose of handling various types of storms, the Department's mechanical organization is set up in two divisions—"A" and "B." The "A" division is the first line of defense and consists of rotary brooms, power flushers with snow plows attached, crosswalk plows and sand spreaders. This division is ordered out immediately when the snow begins to stick to the pavement. It is assigned, through orders of the Division of Street Cleaning, to street intersections where traffic is heavy, and to car and bus stops, bridges and express highways. This last item is one of the most important duties to be performed inasmuch as it serves for the safe passage of pedestrians. As the storm increases in intensity, the "B" division, consisting of large collection trucks with plows attached and mechanical snow loaders, are dispatched to augment the "A" division. This organization is only ordered out in the event that

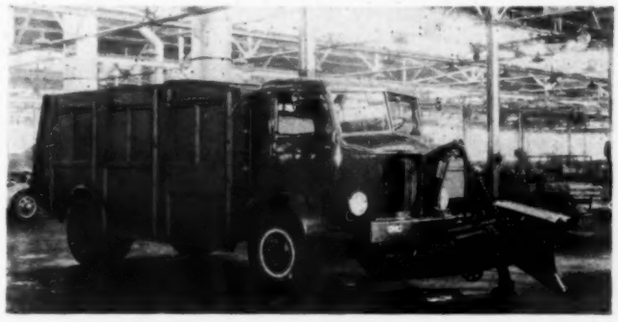


Fig. 4.—Truck Mounted Front End Plow is Attached to Frame

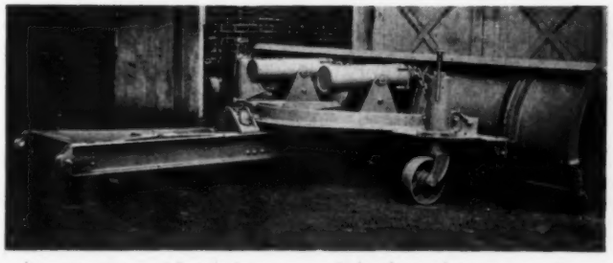


Fig. 5.—Closeup of Plow, Showing Details of Construction

conditions warrant it. The dispatching of snow loaders, which are also grouped in the "B" division, is in most cases delayed until the intensity of the storm has abated and it is possible to cease snow plowing. This time element is determined from the various weather reports which were previously mentioned. A highly important factor is that in every storm of more than three or four inches, all snow plows, crosswalk plows and brooms must be kept in continuous operation day and night. Experience also shows that this operation must not stop until all of the snow is plowed to the curb.

Fig. 7.—Center Mounted Scraper Unit on a New York City Street Flusher

Otherwise, a thaw, followed by a freeze-up might leave the streets practically impassable.

Snow Removal

Once the center of the street has been cleared of snow and the storm has abated to a point where plowing can be abandoned, snow loaders, along with a fleet of trucks, are dispatched to various pre-arranged locations. The amount of area assigned to each machine will vary considerably with the amount of snowfall and weather conditions. The work of removal then continues until all snow is removed from the streets or, warm weather permitting, it has melted and run off.

Equipment

Many varied types of snow control equipment have been developed in New York City and the world's most modern machinery is now in use. Different types of storms require entirely altered procedures. For that reason the following types of equipment are necessary: Snow brooms, sand spreaders, crosswalk plows, front plows, center scraper plows, and snow loaders.

Snow Brooms.—For quite a number of years, the city had been using a heavy-duty snow broom mounted in front of a truck. This unit was cumbersome, requiring the service of at least two men to operate and, at the same time, did not do a very effective job. In 1937, we designed a new type. This machine is a unit known as the Road Patrol, which is ordinarily used for regrading dirt highways. The particular design of the frame lent itself excellently to the mounting of a broom and a snow blade. The broom itself is rugged and is placed in the position of the grader blade. The snow plow is in the position of the scarifier. Both blade and broom operate independently or together, as required. This combination, shown in figure 1, is powerful and is well able to cope with almost any storm condition. It is particularly useful on bridges and elevated highways. Fifty of these machines are in use at the present time.

Sand Spreaders.—One of the most important developments in the fighting of ice storms or light snowstorms has been the use of a power sand spreader. Trailing spreaders had been used in New York City for a number of years with little or no satisfaction. During 1938, thirty-four powered units were purchased. Since that time this force has been augmented by twenty-six, making a total of sixty pieces, which are mounted on truck chasses. The hopper on this spreader, shown in figure 2, holds approximately six cubic yards. The material is fed to a rotating spinner by an auger which is placed in a depression at the bottom of the hopper. By this means, a better control is exercised over the amount of material spread per square yard of pavement. This also results in curtailing considerable man power, thus saving a greater percentage of the cost of fighting such a storm. Executives of the Department feel that the application of salt, in the case of icy pavements, or sand, as in the case of slippery snow, make the streets more passable, and that the ultimate cost of removing this snow and ice from the pavement is reduced to many times less than should we attempt to plow to the curb and then eventually remove the snow by means of a snow loader. Even in the event of a considerable fall of snow, the application of salt at the beginning of the storm so decreases the ultimate volume that only 25 percent to 50 percent of the original amount has to be removed.

Crosswalk Plows.—The primary use of the crosswalk plow is to clean street intersections so that pedestrian traffic can move safely. In addition to that, this little unit serves several other very useful purposes. As stated before much of the snow is pushed into sewers and the crosswalk plow is invaluable in moving the pile up to the manhole after being dumped from a truck. Snow loaders leave quite a little litter of snow behind them as they move up the street. To completely clean this plowed area a crosswalk plow is assigned to each loader in order that this litter of snow may be pushed together and ahead of the loader, where it can be properly picked up. While any rugged tractor would be perfectly satisfactory for the purpose, it so happens that these units are "International Harvester I H 30's." In front of the tractor is mounted a small bulldozer blade, wide enough to cover the tread and hydraulically operated with down-pressure to the blade. There are six hundred and twenty-six of these units available at the present time.

Front Plows.—Practically every automotive unit in the Department is equipped with some type of snow blade. Every collection truck and power flusher which has been purchased since July, 1936, has had a snow blade for each unit which has been mounted on a specially designed member assembled to the front end of the frame, see figure 4, as against the usual practice of mounting on the front axle. Through a study of the design of the blade, the weight of these units has been cut down from approximately two thousand to fourteen hundred pounds. Despite this weight reduction, the plow still maintains the necessary rugged features so that the blade will not be dragged should the truck run into a deep curb or a snow-covered elevated object. These blades are all of the adjustable type, designed to operate either as a bulldozer or as a snow plow working in either direction, right or left. When working as a bulldozer for piling snow, each end of the plow is fitted with what is termed sewer wings. The purpose of these wings is to increase the amount of snow which can be pushed in each single operation. The plow is mounted on a semi-circle or equivalent mechanism, see figure 5, in order that the blade may be reversed and the snow pushed back into the street, where it can be beaten down and melted by traffic.

Center Scraper Plows.—In certain types of storms, regardless of care and promptness, in beginning the snow removal operations there is bound to be certain areas where a formation of packed and frozen snow results. Many attempts have been made to design a piece of equipment which will efficiently handle such a situation, but there have been only one or two which are worthy of mention. One is a machine, shown in figure 6, designed somewhat similar to what is known as a fine grader and normally used for the final grading of a highway previous to the application of the pavement. This has been tested experimentally, but so far has not been developed to a point where it is commercially practical. The other unit which has been

Fig. 8.—Snogo Rotary Plow Loads Trucks Whether Snow is Light and Fluffy, Wet and Soggy, or Hard and Frozen

found to be quite effiecient is the center scraper plow. This is usually mounted the same as a road grader, see figure 7, between the front and rear wheels of a four-wheel drive truck unit and operated in its up and down movement by hydraulic means. This plow is ruggedly designed and mounted against recoil springs to withstand damage. Sufficient pressure can be applied downward on the plow so that a few applications will effectively remove snow which is frozen to quite some extent. There are twenty of these units operating at the present time and in a short time there will be available fifteen more. Department engineers feel that thirty-five four-wheel drive trucks with center scraper plows to patrol the main avenues and protect traffic from the conditions which I have mentioned above will be sufficient.

Snow Loaders.—Regardless of the size of the city, actual snow removal is not economical. If snow could be plowed to the side of the street or curb and immediately removed, this operation would be comparatively simple. It happens, however, that in many cases conditions exist which do not permit the removal of snow until it has been lying long enough to freeze fairly solid. In this condition there are not many types of loaders which are considered sufficiently effective and efficient. Snow loaders have been used in the Department for at least twenty years. Up until the Winter of 1936 and 1937, the only type that was employed was that of the escalator, which loaded trucks by means of various types of augers or paddles at the front end of the machine. These augers or paddles threw the snow on to a chain conveyor belt and from there it was transported into the truck. Under ordinary conditions, this machine will handle a great deal of snow. Where snow is frozen and the temperatures are low, it is almost necessary that the window or snow pile be broken up by hand labor before the loader will operate efficiently.

Because this type of machine is more subject to a breakdown than another, during the winter of 1936 and 1937, forty-two rotary type loaders were purchased. These rotary loaders breakup the snow or ice by means of a rugged auger rotating in front of the machine and which, at the same time, feeds this broken up material into a fan which in turn throws the snow through a chute and into a truck. These machines are strongly constructed and not subject to the breakdowns which would ordinarily occur in the operation of a light-duty machine. Also, these machines have been found to be very practical in the handling of snow at airports, as it is possible to throw the material from seventy-five to one hundred feet off the highway without having to load on to a truck. It is highly adaptable for snow removal work in cities as well as on country highways and will operate under any conditions, regardless of whether the snow is wet and heavy or whether it is frozen hard.

Organization Reduces Costs

Do not let anyone mislead you into the belief that snow removal is in any way economical. Considerable waste, both of time and money, can be eliminated through conscientious study and application to the principles of operation as outlined above. Through the use of this method and the best modern equipment available, it has been possible to reduce the cost of snow removal in the City of New York from over 50c per cubic yard in the Winter of 1935 and 1936 to 28c per cubic yard in the Winter of 1939 and 1940, with approximately the same conditions prevailing.

ACCIDENT RATES IN CONSTRUCTION INDUSTRY CONTINUE DOWNWARD

ACCORDING to figures recently released by National Safety Council the construction industry continued improving its accident record in 1940 over previous years. Compared with 1939 decreases were 10 per cent in frequency and 6 per cent in severity while in industry as a whole there was no change in frequency and only 1 per cent decline in severity. However, both frequency and severity rates in the construction industry are still much higher than the rates for all industry.

In highway work the change between 1939 and 1940 in accident frequency was —24 per cent but in severity it was +54 per cent.

No attempt can be made here to give a detailed discussion of all of the figures which can be secured by addressing an inquiry to the National Safety Council, 20 North Wacker Drive, Chicago. However, we wish to point out that there is a great amount of work still to be done in further reducing the rate of accidents in this field. Intelligent efforts directed to that end will prove profitable not only to the entire industry but also to the individual organization as well. No matter how you look at it safety is a paying proposition.

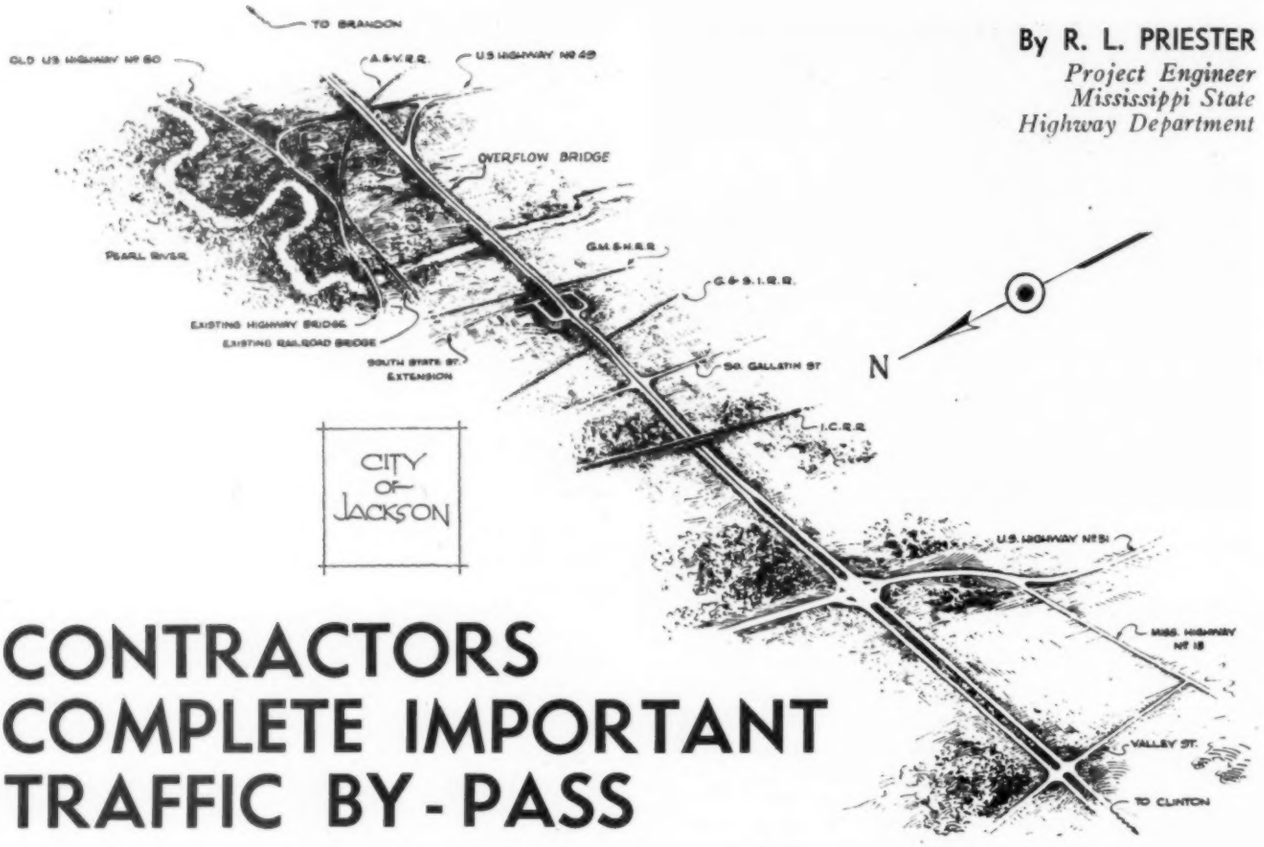
GROUPING OF ESSENTIAL TRAFFIC IN ENGLAND

In a paper presented May 15 before the Eastern Conference of Motor Vehicle Administrators Thos. E. MacDonald, Commissioner of Public Roads, stated that in England essential traffic has been grouped into four classes:

(a) Navy, army and air force traffic
(b) Police, civil defense, inter-hospital and Post Office traffic
(c) Food, petrol and fuel supplies
(d) Traffic required for or in connection with munitions supply and public utility services.

Here it is seen that, while strictly military traffic is placed first on the list, it is but one of four types that are considered essential. In the face of an emergency, such as an attempted invasion, it is proposed to prohibit other traffic from the defense routes.

By R. L. PRIESTER
Project Engineer
Mississippi State
Highway Department



CONTRACTORS COMPLETE IMPORTANT TRAFFIC BY-PASS

First Limited Access Highway in Mississippi is Crowning Achievement of Priority Program

MISSISSIPPI'S first limited access, by-pass highway is nearing completion. Work started on the first section of the by-pass portion in 1938, conforming to a clear cut definite plan adopted from a study of traffic and routes. The new road will relieve Jackson of some of the heavy through traffic on U. S. 80. The work began near Clinton, 8 mi. west of Jackson and is carried south of Jackson, to Brandon, 12 mi. east.

For part of the way, the new road is 4-lane divided, and part, half of a 4-lane divided. The separation of U. S. 49 and U. S. 80 is the first clover-leaf type grade separation in Mississippi; however, it's only a half clover-leaf.

Some Special Features

A.—Planning survey studies provided the following traffic counts on three main routes passing through Jackson.

U. S. Route Out of Jackson	Average Number Vehicles Per 24 Hr. Day
51 South	5500
51 North	3215
49 South	3407
49 North	1717
80 East	5305
80 West	2200
80 & 49 East	8400

These figures are conclusive proof of the need for the elimination of this traffic from the streets of Jackson. However, when they were developed the state was just completing their priority system and outlying districts had to be finished before the Jackson by-pass could be started. Provision for easy handling of traffic over the three main routes was the culminating achievement of the $90,000,000 program. Studies of the traffic problem indicated that the ultimate plan should provide for a relocation of U. S. 80 from Clinton to Brandon. Because of the general directions of U. S. 49 and U. S. 51 through Jackson, and the location of Pearl River with respect to the town and the roads, it was obvious that U. S. 51 traffic could be moved to the edge of Jackson and use part of U. S. 80. Likewise, U. S. 49 could be rerouted on the same street as U. S. 51 going north through town and use another part of U. S. 80 by-pass. A half cloverleaf at a railroad grade separation structure would be the place where U. S. 49 and 51 would come together to go north through Jackson. Other railroad grade separation structures on U. S. 80 could be used by the other routes and thus provide for construction economy.

B.—Within the past few months several of the sub-projects of the master plan have been completed, the last link is now about ready for the pavement slab.

C.—For the full length of the project, selected topping material or selected borrow has been used in depths of 15 in., 18 in., 21 in., or 36 in. as a base course under the concrete.

D.—Side borrow between right-of-way lines was not permitted. Where borrow was required (and there was considerable of it) contractors were provided with borrow pits off the highway right-of-way. Selected soil

borrow pits were provided wherever found within reasonable distance of the work.

E.—Shoulders were stabilized for a distance of 3 ft. on the edges of the concrete paving slabs.

F.—Perforated 6-in. concrete pipe placed in the ditch lines 6 in. below the bottom of the top-soil or selected borrow base provided drainage for the tight clay and silty soils, A-6 and A-7, out of which the embankments had to be constructed.

G.—Eleven cubic yards of gravel backfill per 100 ft. of 6-in. sub-drain surrounded the pipe prior to backfilling the trench with selected, porous topping material obtained from borrow pits.

H.—No surface drainage from cuts was allowed to strike embankment toes. Wing ditches or terraced drainage traces were constructed on 5 ft. contours.

I.—Intersecting roads were not permitted in cuts; intersecting roads must approach the line of the new road on the contour of the 0.0 cut point.

J.—Clearing and grubbing operations provided for tree selection within the right-of-way lines, saving good trees and thinning enough to assist their growth.

K.—Some of the soil had as high as a 196 per cent volume change between the dry state and the liquid limit. Herewith is a typical sample analysis:

SAMPLE NO. 5, STATION NO. 84400, DEPTH 3 TO 6 FT.

PHYSICAL CHARACTERISTICS

L.L.—126, P.I.—94, S.L.—9, S.R.—1.78, C.M.E.—74, F.M.E.—61, Volume Change—196.

MECHANICAL ANALYSIS

Percent Retained on No. 10 Sieve	0
Percent Coarse Sand	4
Percent Fine Sand	2
Percent Silt	8
Percent Clay	86
Percent Colloids	64
Group	A-7
H Cl Reaction	Violent

L.—Limited access, no ramps to approach the road except at cross-overs, about every 1200 ft.

M.—Regularly spaced expansion joints at 40 ft. intervals (all joints are expansion joints) are filled with pre-moulded asphalt and sealed with poured asphalt.

N.—Curved face of curb is a cycloid section.

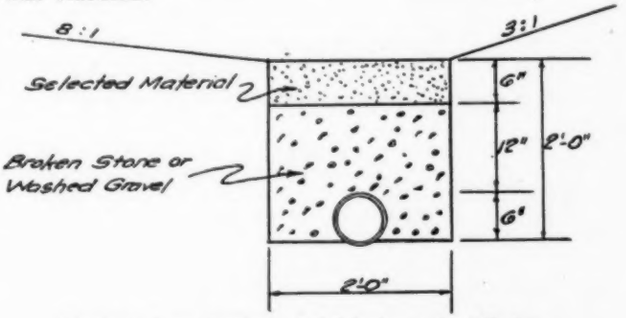
O.—From the I.C.R.R. underpass south of Jackson on west to Clinton, a 20 ft. median strip is grassed. From this underpass on east to where the 4-lane pavement ends a short distance east of Jackson the median strip is 4 ft. wide and grassed. Over the bridge structures the median strip is poured concrete, fastened onto the floor of the structure.

P.—Service drives are provided parallel to the main highway along each outer edge of the 200 ft. right-of-way at locations on the road where development of abutting property warrants such lanes. They will be built anywhere along the road in the future as development warrants. This feature provides ingress and egress to adjacent property without danger of conflict with through-traffic.

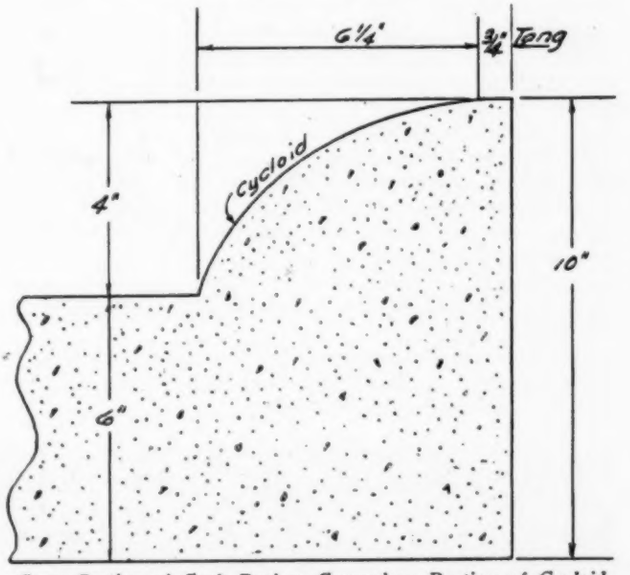
Q.—Wire mesh reinforcement weighing 55 lb. per 100 sq. ft. was used with a 9-in. overlap at joints.

R.—On the channel changes, side slopes were riprapped at bends and at ends of bridge fills.

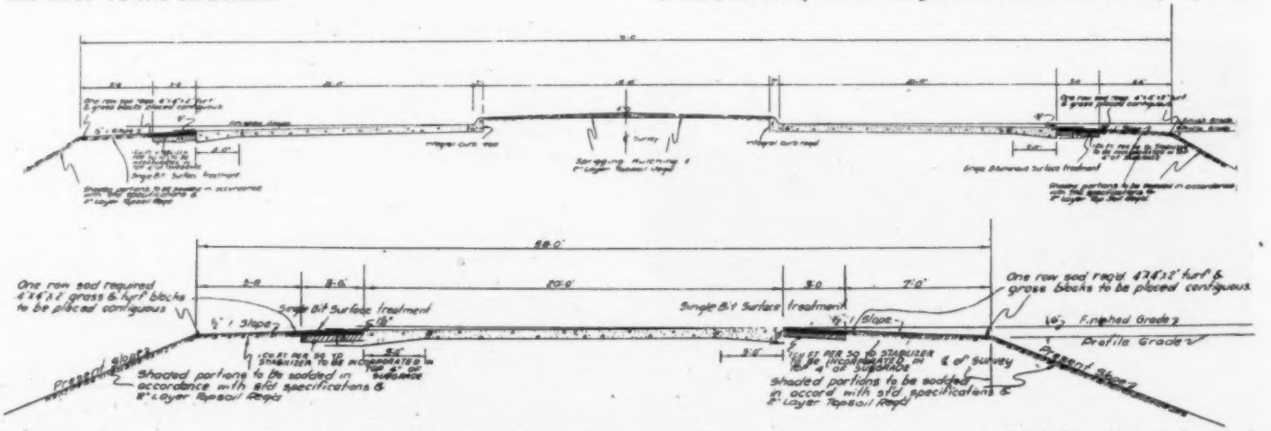
S.—Concrete along forms and around joints, only, was vibrated.



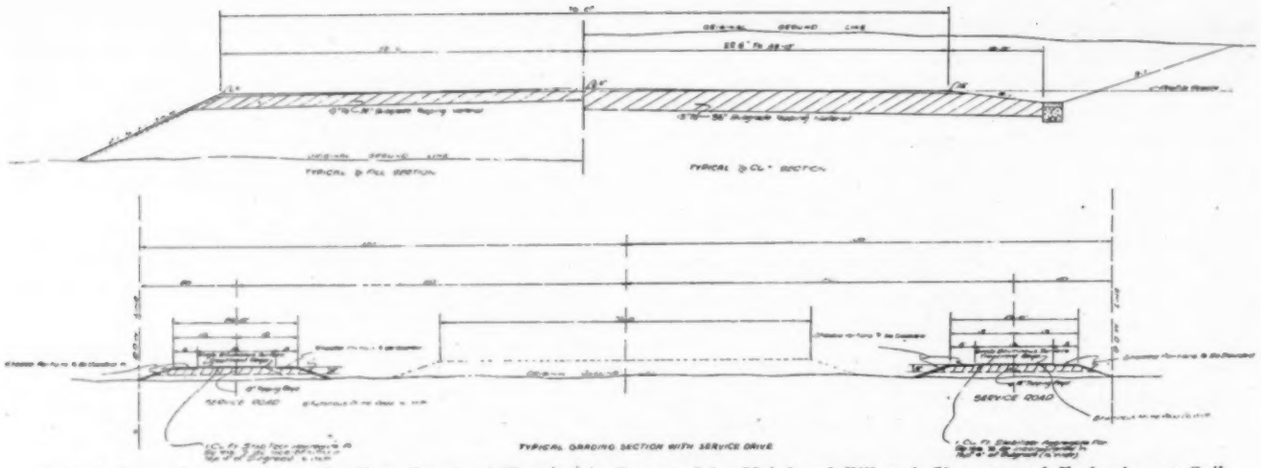
Typical Cross-Section of Subdrainage Installations



Cross-Section of Curb Design. Curve is a Portion of Cycloid


One row sod required 4'4½" grass & turf blocks to be placed contiguous
Single Bit Surface treatment
Finished Grade
Profile Grade
Original Slope
Shaded portions to be sodded in accordance with std specifications & 8" Layer Topsoil Reqd

Typical Cross-Sections of Dual-Lane and Half Dual-Lane Highway, Showing Pavement Section, Stabilized Shoulder Strips, Sod Strips, and Median Strip



Typical Cross-Section of the Grading. Depth of Topping is Governed by Height of Fill and Character of Embankment Soil

Design

Typical cross-section of grading and paving are shown in accompanying illustrations. To properly handle the traffic, the paving section required two 9 in., 6 in., 9 in. concrete slabs 20 ft. wide, two lanes in each direction, a median strip and two 8 ft. shoulders. The unpaved median strip is retained by integral curbs of cycloid cross-section. On the shoulders, along the pavement edge, a strip of stabilized soil, 3 ft. wide, is packed 4 in. deep and topped with a single bituminous surface treatment. Next to this is a row of sod and on the shoulder line another row of sod. Sprig sod was planted between these rows. Dredges provide four 11 ft. lanes and a raised dividing strip.

Where the 2-lane sections are placed, they are half of a 4-lane cross-section with the half median strip becoming a shoulder and graded as such. West of Jackson the north half was constructed. East of Jackson the south half was constructed. The four-lane work is just south of Jackson. Cuts were dug only wide enough to accommodate a 2-lane cross-section where the 2-lane is placed.

Surfaces for the returns of less important intersecting roads are made of different colored material so as not to mislead through-traffic.

Meador's Contract

The first section east of Clinton, about 4½ mi., was graded and drained by J. E. Meador & Co., of Arkadelphia, Arkansas. Part of the job was 38 ft. graded crown width and about ¼ mi. was 76 ft. graded crown width. This section was completed on Oct. 25, 1938, at a total cost of $188,870.19.

Caterpillar 12 Ft. Motor Grader Smoothing Crown of Embankment Prior to Placing Selected Topping Material. Assistant Project Engineer Whitley Inspects Cook's Results. Top of this Soil Substructure is Crowned So That Any Water Seeping in from the Surface Can Move to the Edge Slope

Meador & Co. bid $0.17 for unclassified excavation, $0.20 for topping material, $0.0225 per ½ mi. haul for overhaul on topping, and $0.35 per ft. for 6 in. perforated concrete tile drain in place. A typical section of the tile drain is shown herewith. Sub-drainage, in accordance with this design, was installed in all cuts.

Meador performed all work from Sta. 0+00 (Clinton) to Sta. 239+71, of which from Sta. 0+00 to Sta. 213+00 was 2 lane and the rest 4-lane with 76 ft. width shoulder to shoulder.

Gillioz' Contract

From Sta. 239+71 to Sta. 350+13 and from Sta. 462+87 to Sta. 593+17 all work was performed by M. E. Gillioz, Inc., Monett, Mo. On this job he used 2 power shovels and about a dozen 10 yd. Hug trucks, two AC-GarWood scraper outfits, 1 Caterpillar elevating grader and 30 to 40 one and one-half ton trucks.

Gillioz used a novel method for finishing the embankment slopes. It is shown by an accompanying schematic line drawing. A powered leaning-wheel 12 ft. blade grader was towed by a Caterpillar tractor along the embankment slope. To hold it in place a holding cable was attached to the rear end of the grader and to the front end of another crawler tractor which so manipulated its speed as to keep the grader always in position. For turning around the rear tractor stopped while the tow tractor swept in a fairly wide arc as it pulled the grader over the crown of the embankment and down the other side. The blade was set at a slight angle to throw the scrapings up hill. Only a small amount usually escaped over the upper end of the blade.

Another useful bit of grading practice was employed on this contract. By arrangement with the project engineer the fill was started about 2 ft. inside of the slope stakes, carried up at a steeper slope than the plans indicated and at the top was made 2 ft. wider than the crown width, shoulder to shoulder.

This was done because, as all grading contractors know (or soon learn) the fill has a tendency, through natural causes, to widen at the bottom. Many contractors have attempted to finish the embankment slopes on their jobs by dragging the dirt up the slope from the bottom, to replace what has been washed down. Often big chunks are left, during normal dumping operations, on the fill slopes. In finishing, these must be rolled to the bottom so that finer finishing material will be available in the final finishing stages. By making the fill wider on top, and using the grader finishing method employed on this contract, the first

round is a cut on the shoulder line. This immediately gives the operator loose extra dirt to use in his finishing operations as the grader works its way down the embankment slope. It breaks up some of the big chunks and rolls others to the bottom. By the time the grader has worked its way to the bottom, the toe of the fill has been widened out to the slope stakes, and the slopes conform to required design and finish.

Gillioz completed his contract in June, 1939, at a total cost of $283,828.65. The first part of the job was built to a 76 ft. crown, the second part to a 60 ft. crown. Unclassified excavation was bid at $0.20 per cu. yd. Overhaul on excavation was $0.03 per cu. yd. per half-mile haul; topping material, $0.22 per cu. yd. and overhaul on topping $0.03 per cu. yd. per half mile.

On this job, from Sta. 239+71 to Sta. 350+13 was 4-lane width with 76 ft. top and from Sta. 462+87 to Sta. 593+17 was 4-lane width with 60 ft. top.

Cobb's Contract

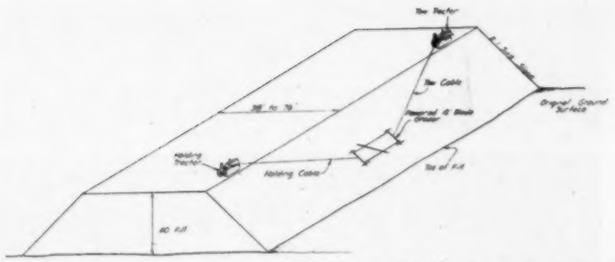
Cobb Bros. Construction Company of Meridian, Miss., had the grading contract from Sta. 350+13 to Sta. 428+00. This was 4-lane with 76 ft. crown. They also had all paving work from the beginning of the project over both Meador's and Gillioz' grading jobs.

For paving over Meador's the west portion of Gillioz', and their own grading jobs they bid $1.59 per sq. yd. for the 164,000 sq. yds. of reinforced concrete pavement involved. On part of the grading on their dirt section they bid $0.25 for unclassified excavation $0.22 for topping material, $0.03 per sq. yd. half mile unit for overhaul on topping, and $0.70 per lin. ft. for the gravel backfield 6 in. tile sub-drainage.

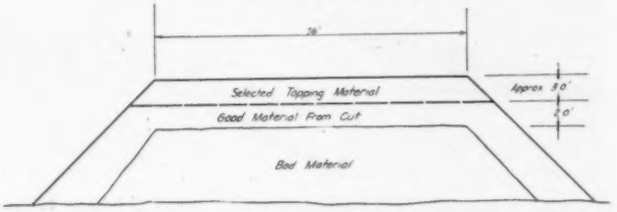
An another section of their grading work they bid $0.25 per cu. yd. for unclassified excavation, $0.93 per cu. yd. for topping material, $0.02 per cu. yd. half-mile unit for topping overhaul.

For paving over the eastern part of Gillioz' grading job they bid $1.65 per sq. yd. for 61,800 sq. yds. of reinforced concrete pavement. The section built is shown in the accompanying diagrams. The total cost of their work was $604,000.

Cobb sublet the grading to John Oman, Nashville, Tenn., who used some 12 yd. and some 28 yd. scrapers.



Showing, Schematically, How Gillioz Finished Embankment Slopes With Powered Blade Grader



Showing How Poor A-7 Soil Was Confined in an Embankment. Extra Haul Had to Be Allowed to Get This Result. Section Shown is Through Worst Part Where 3 Ft. of Topping Material Had to Be Used. This is on a 3-Lane Road Width

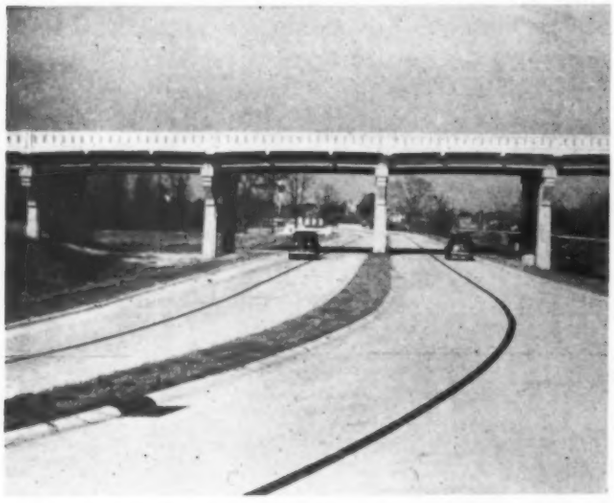
Cook's Contract

From Sta. 428+00 to Sta. 462+87, W. G. Cook, Forest, Miss., is grading draining, and paving the completing link of the whole project. This job includes an underpass to carry traffic under the I.C.R.R.

Cook bid $0.20 per cu. yd. for unclassified excavation, $0.20 per cu. yd. for topping material, $0.80 per lin. ft. for 6-in. sub-drainage, and $1.80 per sq. yd. for reinforced concrete pavement. At this writing the grading is about complete and the footings for the underpass are poured. His total contract for three-quarters of a mile of dual lane with underpass is $160,000.

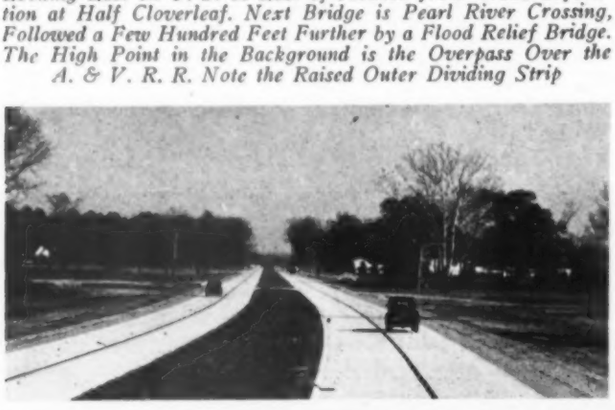
Cook is using four 8 yd. Euclid bottom dump trailers, one 12-yd. Caterpillar-LeTourneau scraper outfit, one ¾ yd. Koehring crane with 1¼ yd. special dragline bucket, and one Caterpillar-LeToureau bulldozer—double sheepsfoot roller unit on the grading. Paving hasn't started yet. Unlike Gillioz, he built his fill the full width of the base at the slope stakes. Parts of the big fill have extra hauling and finishing.

Aerial View of Half Cloverleaf Where U. S. 51 and U. S. 49, Respectively, Leave and Enter U. S. 80, South of Jackson



Section of Cloverleaf Looking North Toward Jackson Where Cloverleaf Passes Beneath Grade Separation Structure

Looking East on U. S. 80 East of Jackson from Grade Separation at Half Cloverleaf. Next Bridge is Pearl River Crossing, Followed a Few Hundred Feet Further by a Flood Relief Bridge. The High Point in the Background is the Overpass Over the A. & V. R. R. Note the Raised Outer Dividing Strip



View of U. S. 80 West of Jackson, Mississippi, Looking East Toward Town and Outside of the Corporation Limits

Neely Contract

From Sta. 593+17 to the city limits of Brandon, grading and drainage was completed by F. S. Neely, Amory, Mass., and paving by Cobb Bros. Construction Company. This is approximately an 8½-mile stretch in which only one-half of a 4-lane design was built. This typical cross section is shown elsewhere.

Bridges

With the exception of the overpass over the A. & V. R.R. which was constructed by Kelleher Construction Company, Dallas, Texas, all bridges and grade separation structures were built by M. E. Gillioz, Inc., except Cook's underpass an the main line of the I.C.R.R.

Contractor Cook's Koehring Crane With Special Dragline Bucket Loads 12 Yds. On to 10 Yd. Euclid Bottom Dump Trail Buggies

Topping

Because of the large volume change characteristics of the soil the embankment substructure of the entire project was topped with different depths of selected sand-clay topping material.

For one stretch where the soil was particularly bad, excavation taken from the cuts was so handled that the worst material was buried within the embankment as shown by the accompanying diagram. Over this particular stretch the topping was placed 3 ft. deep. On some sections 15 in. of topping was used and on others, 18 in. or 21 in.

On the whole project over 40,000 cu. yd. of bad clay soil was wasted from the cuts. Only as much was used as could readily be worked into the better soil by the sheeps-foot roller. Waste was used to build berms along hihg fills. All topping was hauled from borrow pits, some as much as five miles distant.

Personnel

The entire program was jointly sponsored and financed by the Mississippi State Highway Commission, the Public Roads Administration. Administrative matters were directed by E. D. Kenna, Director, Mississippi State Highway Commission. The engineering administration, design, preparation of plans, and construction were performed under the supervision of R. A. Harris, Chief Engineer; E. B. Cavallo, Construction Engineer; C. S. Hill, Bridge Engineer, and J. F. Fonville, Engineer of Plans. Execution of the work was under the direction of C. W. F. Harper, E. W. Manley and George S. Covert, Jr., District Engineers, M.S.H.D.; and R. L. Priester, F. C. Cain, and D. J. Simmons, Project Engineers assigned to various sub-projects.

For the contractors the following superintendents handled the construction work:

Mr. C. B. Atkinson on grading for Meador.
Mr. H. A. Maggi on grading for Gillioz.
Mr. Wygle on structures for Gillioz.
Mr. D. F. Gibbs on paving for Cobb Bros.
Mr. B. A. Beasely on grading for John Omar of Nashville, Tenn., who subbed grading from Cobb Bros.
Mr. O. R. Kelly and Mr. R. H. Sherman for Kelleher.
Mr. F. S. Neely on grading for Neely.
Mr. J. H. Bledsoe on grading for Cook.
Mr. J. H. Moon on structures for Cook.

ON THE LOW COST OF BITUMINOUS ROADS IN SOUTH CAROLINA

Economy Depends Upon Skilled and Adequate Maintenance

By C. R. McMILLAN
State Highway Engineer of South Carolina

LOW COST roads, born of necessity about 18 years ago, have stood their test in South Carolina and even with the rapidly increasing burden of heavy traffic the state highway department looks to the future with confidence, knowing that there is no false economy either in construction or maintenance.

Force of financial circumstances prompted this state to pioneer in this work, especially in utilization of local sand clay and topsoil materials. A trial-and-error system was necessary in the beginning, but experience both in building and maintenance has developed processes along scientific, almost fool-proof lines.

Engineering Improves Results

It was discovered early in the experiments that good roads could be built with bituminous protective coating on the cheaper bases of local sand-clay and top-soil materials, but there remained skeptics who doubted the durability of these materials. Only time, of course, could prove the results, and time had done just that. There were some outright failures and some mediocre results, but on the whole the results have been satisfactory from the outset.

Present-day methods have practically eliminated the chances of failure and although experienced engineers are required, the processes are more according to the scientific factors than in the early days when one engineer could get good results and others would fail. South Carolina's topography lent two distinct local soil materials—sand-clay and mountainous top-soil from which excess clay has weathered, leaving a mixture of small size gravel, sand and clay, six to 12 inches in depth.

The State by natural phenomena is divided almost in half by what is called the "Fall Line," creating the "Up-country" and the "Low-country." The Up-country offers the top-soil material, usually found on hills and knolls. The Low-country, beginning with the fall line and extending to near the Atlantic Coast, gives the sand-clay materials. The fall line may be roughly described as a line joining Augusta, Ga., with Columbia, S. C., and extending on northeasterly to the State line.

Experience has shown, both as to cost and results, that were a road to be built at the fall line with sand-

Fig. 1.—Five-foot Shoulders Built and Low Places in Old Road Patched with Sand-Asphalt Material Over MC Seal B fore Retreatment Put on Surface. Route 301, Dillon County, S. C.

Fig. 2.—Mixing Resurfacing Material with Single Retread Power, Followed By Double Mixer

Fig. 3.—Spreading and Leveling Retreatment with Double Retread Paver. Note Pointer on Tractor Following String for Alignment

TABLE OF 21 REPRESENTATIVE PROJECTS IN SOUTH CAROLINA'S RETREATMENT PROGRAM FOR 1941.

COUNTY	Route Number	Project Number	Length	Year Constructed	Base Type	Base Cost per Sq. Yd.	Surf.* Type	Surf. Cost per Sq. Yd.	Cost of Base & Surf. Treat.	Year Retreated	Cost of Retreatment	Mtce. Av. Annual Cost per Sq. Yd. Surf. & Base	Av. Daily Traffic
Aiken	19	NRH 272-B Sec. 1& 2	6.409	1934–35	Sand Clay	$0.1999	2	$0.30	$0.4999	.....	.....	$0.00407	403
Edgefield	19	NRH 272-A Sec. 1 & 2	3.660	1934–35	Sand Clay	0.1892	2	0.30	0.4892	.....	.....	0.00238	370
Lexington	6	NRS 347	6.117	1934–35	Sand Clay	0.2062	2	0.30	0.5062	.....	.....	0.00515	245
Lexington	6	NRS 347-B	2.017	1934–35	Sand Clay	0.1974	2	0.31	0.5074	.....	.....	0.00515	157
Kershaw	34	EFA 91 Reop EFA 67 Reop	11.389	1933	Sand Clay	0.1295	2	0.23	0.3595	1936	$0.109	0.00415	711
Lee	34	EFA 67 Reop Sec. 2	10.586	1933	Sand Clay	0.1386	2	0.23	0.3686	1936	0.113	0.00508	561
Berkeley	31	S-530 Reop	7.3445	1937–38–39	Sand Caly	0.17589	2	0.26	0.43589	.....	.....	0.00372	430
Berkeley	31	S-530 Reop	10.945	1937-38–39	Sand Asph. Mixed-in-Place	0.3373	3	0.21	0.5473	.....	.....	0.00372	475
Georgetown	51	S-414-A	6.7598	1938–39	Cement Stabilized	0.3804	1	0.12	0.5004	.....	.....	0.00230	113
Georgetown	51	S-414-B & S-414-C	13.170	1936–37–38	Sand Asph. Mixed-in-Place	0.5516	4	0.17	0.7216	.....	.....	0.00230	193
Allendale	5	FA 61-Ext (2)	1..152	1934	Sand Clay Stabilized with Gravel	0.2375	2	0.24	0.4775	.....	.....	0.00256	716
Allendale	5	NRH 40 Sec. 1 & NRM 40	5.093	1934	Sand Clay Stabilized with Gravel	0.2402	2	0.325	0.5652	.....	.....	0.00256	320
Marlboro	1	S-74 Reop &			Gravel	0.1923	2	0.345	0.5373	1936	0.139	0.00921	1,130
Beaufort	46	Ext 1 & 2 S-760	7.588 9.747	1931 1931–32	Sand Asph. Mixed-in-Place	0.32999	1	0.18	0.50999	.....	.....	0.0084	290
Orangeburg	4	FA 361-C	7.249	1938	Tar Stabilized Base	0.330294	1	0.14	0.470294	.....	.....	0.0025	171
Cherokee	11	NRS 369	6.427	1935–36	Top Soil	0.1217	2	0.25519	0.37689	.....	.....	0.0025	371
Oconee	24	NRS 365-A	2.473	1935	Top Soil	0.317	2	0.33	0.647	.....	.....	0.0053	340
Oconee	24	S-365-C	5.851	1935	Top Soil	0.1533	2	0.25	0.4033	.....	.....	0.0053	296
Oconee	24	NRS 36-B	5.444	1935	Top Soil	0.1752	2	0.28	0.4552	.....	.....	0.0053	151
Union	9	NRH 333	8.989	1933–34	Top Soil	0.1939	2	0.29	0.4839	.....	.....	0.0034	317
Union	92 & 9	NRH 94 & NRH 100	5.583	1933-34	Top Soil	0.1835	2	0.29	0.4735	.....	.....	0.0034	278

*Note: 1 is single bituminous surface treatment.
2 is double bituminous surface treatment, called regular surface treatment.
3 is surface treatment without seal.
4 is road-mixed surface treatment.

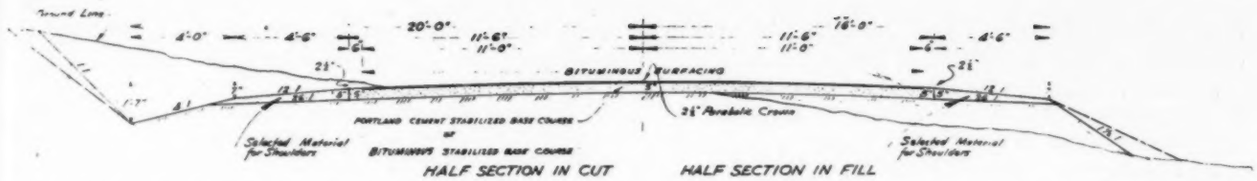


Fig. 4.—Typical Section of South Carolina Construction Types Showing 5 In. Base for Both Soil-Cement and Bituminous Stabilized

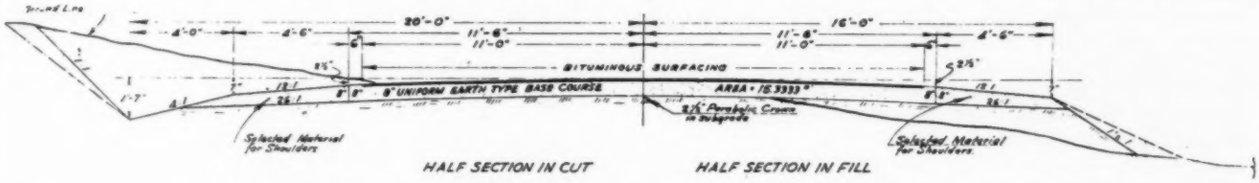

BITUMINOUS SURFACING
6" UNIFORM EARTH TYPE BASE COURSE
Selected Material for Shoulders
HALF SECTION IN CUT
HALF SECTION IN FILL

Fig. 5.—Typical Section of South Carolina Construction Showing 6 In. Earth Type Base Course

clay on one side and top-soil on the other, it would hardly matter which base was chosen.

Maintenance Imperative

During the present season the South Carolina Highway Department has adopted a program of retreating 570 miles of low cost roads, following the annual winter inspection of determining the needs for such work. The bituminous surfacing on these roads is only a thin wearing cover to protect the base, which really carries the load. It is essential that this protective coating be maintained in good condition. It has been found that retreatment is required on an average of about five years, depending of course upon various conditions of use, weather and so forth.

It should be pointed out that if the bituminous mat or surface is neglected for any length of time, the base and whole road may be damaged so badly that it will be necessary to reconstruct at a cost far in excess of that for retreatment. Thus the economy of low cost roads depends upon skilled and adequate maintenance. In many cases it has been found that the cheapest bases of local sand-clay and top-soil materials have given the best results.

The accompanying table, showing 21 representative projects in this year's retreatment program, has been prepared to give you a better and a concise statement of construction, type of base, cost per square yard for base and surface, the average annual maintenance per square yard and the daily traffic.

From this table it may be seen that the results from the local materials are economical where maintenance is systematically followed through, and every road man knows, of course, that adequate maintenance is essential for all types of roads.

A question arises as to whether the base course is natural material or blended material. The answer is that sometimes sand or gravel must be added and when very much gravel is added, it is commonly called a stabilizer.

High Silt and Clay Content.—As to the nature of the local South Carolina materials, good top-soil tests a bit higher in silt and clay than good sand-clay material. This is due to the fact that soil is secured from the top six or 12 inches of cultivated fields. In the cultivation of these fields from year to year the plasticity of the clay is lessened. It is not unusual to use top-soil material with from 15 to 18 per cent clay and 15 to 18 per cent silt with excellent results.

Sand-clay material is found in South Carolina in water bound deposits in pockets with areas from just a few square yards to not more than four or five acres in any one deposit. Good results can be expected with sand-

Fig. 6.—Rear View of Double Retread Paver Leveling Off Surface

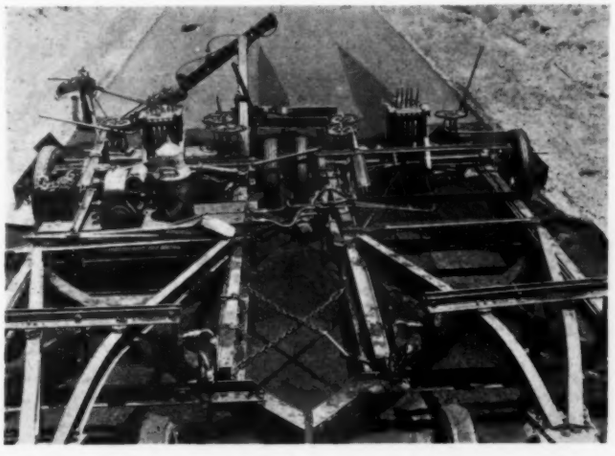


Fig. 7.—Towing Tractor View of Double Retread Paver

Fig. 8.—Rolling Finished. Retreatment Is Last Step Before Turning Road Open to Traffic

clay having a clay content of from 10 to 20 per cent and a silt content of from one to two per cent.

Priming.—Tar has been adopted as a standard for priming on the top-soil and sand-clay bases while asphalt is used at times on traffic bound macadam.

Drainage.—In order to protect the base from surface water and sub-surface water, maintenance forces spend considerable time cleaning ditches and improving drainage conditions. Sometimes in the winter, the bituminous surfacing on an old project cracks at places where there is a slight movement or yielding in the base. As soon as these cracks are observed, in order to protect the base from surface water which will cause it to soften, the surface is covered immediately with an inverted penetration seal. All holes are patched promptly with material similar to that used in the original surfacing.

Surface Treatments.—Three types of surface treatments are now used in South Carolina: First, double bituminous surfacing placed on a selected soil base; Second, single bituminous treatment placed on a stabilized base; and Third, a mixed-in-place treatment which is built on either type of base and is also used as a retreatment of an old surfacing.

Retreatment work is carried on between the first of May and the last of September. The retreatment not only adds thickness to the old surface, but it adds life or flexibility. The old treatment becomes thinner and brittle with age.

A road after retreatment is usually kept closed to traffic from two to six days, but if necessary the road may be opened immediately for ordinary traffic by spreading four or five pounds of sand per square yard over the treatment.

South Carolina today has approximately 6,700 miles of hard surface in its state highway system, of which approximately 4,300 miles are of the low cost, surface treatment type.

▼

FOR TESTING CONCRETE

A new and improved method of determining the air-content of freshly placed concrete has been developed by the National Bureau of Standards, Department of Commerce.

In this method the measured volume of concrete is inundated with water, vacuum is applied, and the container is agitated by rolling in order to release the air bubbles. The volume of air released is measured by replacement with water.

There are good grounds for believing that the air-content of freshly placed concrete is a factor which may greatly affect its properties and particularly its weather resistance. For this reason the new development is important.

▼

TEMPERATURE REDUCTION OF A CUTBACK ASPHALTIC CONCRETE AGGREGATE DRY-MIXED IN A PUG MIXER FOR FIFTEEN SECONDS

Abstract from Report on Texas Highway Department Asphaltic Concrete Research Special Investigation No. 8

This investigation was made in an attempt to settle the controversial question as to what heat loss takes place when hot aggregate is introduced into the pug mill and mixed five to twenty seconds before the introduction of the asphalt as required by the specifications for cold mixes.

The tests showed the heat losses in the laboratory pug mill to be less than 5 per cent and to be smaller with lower temperatures. It is believed the losses will be less in a full size mixer.

Recommends that the heat of the aggregate in the mixer be controlled on the basis of the temperature in the bin and that the difference shall not be more than 5 per cent.

▼

INFLUENCE OF DIFFERENCES IN THE COMPACTIVE EFFECT OF PROCTOR MACHINES ON THE COMPACTION OF SOILS AND SOIL MIXTURES

Abstract from Report on Texas Highway Department Soil Research Investigational Project No. 36-A

This report shows a comparison of the compactive effect obtained on soils of low, medium and high plasticity with three Proctor compaction machines (the weights for which are lifted with a string) and one standard Proctor field set. The three string machines were rated by mechanical calibration as being in poor, good and excellent condition, the latter machine being ball bearing.

Tests were made on the different soil types with the machines supported first over one of the legs of a rigid concrete table and then in the center of a 5-foot 1 x 12 flexible board, supported at each end. These tests showed that the type of support is of little or no importance provided the compacting procedure is correct and when this is true, the difference in compaction of soils and soil mixtures by various machines is of consequence only when the soil is of a type sensitive to compaction, and the machine is definitely in poor condition.

The machine in excellent mechanical condition gave the most consistent results, usually with but slight variation from the results with the standard field set.

▼

NEW RECORD FOR POURING CONCRETE

As the August issue of Roads and Streets goes to press, word has been received that for the third time in little over a month the California record for one day's concrete placement has been broken on the Central Valley Project. This time it is Shasta Dam's workmen who have regained the honor by pouring 9,904 cubic yards in three shifts on July 25.

Early in the year Friant Dam held the record at 7,634 yards poured on March 23, according to the United State Bureau of Reclamation which is supervising the construction of both dams. Concrete crews at Shasta set a new mark of 8,267 yards on June 22, only to have Friant come back with a higher total of 8,842 yards on July 12. Shasta's latest record of 9,904 yards represents almost 20,000 tons of concrete added to the rising blocks of the dam in 24 hours.

Officials of Pacific Constructors, Inc., the general contractor at Shasta, expect the daily totals to go even higher when the spillway section of the dam is cleared for concreting. So far the concrete work has been confined largely to the abutment sections on both sides of the river.

ASK CONTINUATION OF FEDERAL HIGHWAY POLICIES

Position of Western States Is Stated by WASHO

THE FOLLOWING communication from the Western Association of State Highway Officials was received too late for inclusion in the July issue of ROADS AND STREETS; but because of its clear presentation of Western needs and the Western position in regard to Federal funds, we print it almost in full, together with a resume of the resolutions submitted by the Association to Congress, using the language of these resolutions as far as possible. Incidentally, this statement of position would be appropriate for a number of states not represented in the Western Association.—EDITOR.

Western Association's New Officers

At the recent convention of the Western Association of State Highway Officials at Casper, Wyoming, C. F. Seifried, Chief Engineer of the Wyoming Highway Department was elected President. General Robert Lee Bobbitt, Member of the Texas Highway Commission is the New Vice-President. John E. Furlong, Manager, Colorado Hwy. Planning Survey is the new Secretary-Treasurer. New members to the Executive Committee are: Dr. L. I. Hewes, Chief, Western Region, Public Roads Adm., San Francisco; James A. Davis, Acting Director, Washington Highway Department; Fred Grumm, California Hwy. Dept.; Burton G. Dwyre, New Mexico State Hwy. Dept. and retiring President of W.A.S.H.O. Standing members of the committee are: W. R. Hutchins, Arizona State Hwy. Engineer; and Robert A. Allen, Nevada State Hwy. Engineer.

The Western Association of State Highway Officials is composed of Highway Department Officials of the following states: Arizona, California, Colorado, Idaho, Montana, Nevada, New Mexico, Oregon, Texas, Utah, Washington and Wyoming. To these highway officials the tax payers and road users of the state have entrusted the administration of the construction and maintenance of state highways. These officials are constantly being urged by various interested road user organizations as well as organizations of citizens in various towns and organizations of farmers and ranchers to accelerate the road-building program. Now with the national emergency facing the nation, they are being urged by national defense authorities to immediately rehabilitate and put into better shape access roads leading to army cantonments and industries necessary for national defense. The real picture of the highways of the nation and the western part of the United States in particular, and the necessity for their immediate improvement, is fully realized by the various interests referred to above. However, there seems to be a certain amount of apathy on the part of a large portion of the remaining public, including a great many newspaper editors. The Western Association feels that this apathy is due to a lack of knowledge and understanding of highway problems.

The highway officials of the western states in particular, in asking for additional funds from the Federal Government are acting as agents and solicitors for the road users of the nation as a whole and for the various states. The inference to be drawn from some statements in the press is that highway officials, in order to feather their own nests, are asking for increased funds to spend just for the sake of spending and are asking for this in the name of national defense and are "padding the needs with theoretical conceptions or community desires masquerading behind defense requirements." This is not correct. During the past several years very careful surveys and studies have been made in all the states in co-operation with the Federal Public Roads Administration and Army authorities as to the needs of the highways; and the representations which the Western Association of State Highway Officials are making to Congress are based on a careful study of these needs.

The accompanying resolutions and agreements passed at the recent meeting of the Western Association at Casper, Wyoming, have been made after a very careful and thorough study; and all chambers of commerce, motor associations and other agencies interested or concerned about the present condition of the highways of the nation should give these resolutions careful study. Interested road users should communicate with their Congressmen, calling attention to these needs. These same road promotion agencies should also make a concerted effort to overcome the apathy on the part of a large section of the public for the continuance of the road building program. This legislation is before Congress now, so prompt action is required.

Resume of Resolutions and Agreements

In January, 1941, the Defense Roads Committee of the Western Association of State Highway Officials met in Denver, Colorado, and came to certain agreements, to-wit: that the Congress of the United States be asked that the total road use taxes be returned to the several states, through the Public Roads Administration, in the usual manner for road-building purposes; that owing to the vast mileage of the highways of the western states being on Government owned or controlled lands, the percentage of participating matching funds be lowered as to state participation. The defense roads committee in Denver computed the balance of the above amount of the total road use taxes collected and found that $287,000,000 based on the federal gasoline tax of 1½c was not returned to the states for use on the highways. This situation was presented to the Congress of the United States, by General Robert Lee Bobbitt, of Texas, Chairman of the Defense Roads Committee, and a tentative bill was drawn, to-wit: $100,000,000 for the strategic system to be matched by the several states; $150,000,000 to be expended on access roads, with no participation by the several states, but the same to be administered by the Public Roads Administration through the several highway departments; $25,000,000 to be expended on tactical roads to be administered by the Public Roads Administration through the several highway departments; $12,000,000 to be expended on surveys and plans for future post war roads to be administered by the Public Roads Administration through the several highway departments.

The expenditure of forest moneys, whether on the strategic system or within the forest itself, is in line with National Defense as to the quicker delivery of the necessary lumber for National Defense.

(Continued on page 48)

DROUTH AIDS GRADING OF MOBILE AIRPORT

Elevating Grader and Scrapers Work Near Capacity Operation

QUANTITY production characterized the grading operations on the Mobile (Alabama) Municipal Airport. An average of 130,000 cu. yds. of grading per month was moved by an elevating grader with trucks and 6 tractor-scraper outfits from the time they started work (about March 15) to date. Compared to other costs for grading in this area, the cubic yard costs are exceptionally low. During May, for example, 154,600 cu. yds. of the hard red clay were moved for an average of 17 cents a cubic yard. In June there were a few rainy days so the cost rose slightly, yet 124,100 cu. yds. were moved the average haul distance of 1500 ft. for 20 cents a cubic yard.

The Cletrac With Bulldozer Keeps Dump in Shape When Filling Swamp Area. Also Helped Load Scrapers in Tough Digging

Location and Site

The Mobile Municipal Airport is about 12 miles west of the Mobile post office on the Dickens-Ferry road. It was moved out there when the War Department took over their old field along the bay front at the foot of Washington Ave.

When it was decided to enlarge the old field tremendously and convert it into an air corps repair depot, the new municipal field had to be located at least six miles away from the flying area of the old field. The flying area of the old field, now called Brookley Field, was established as 6 miles, so the new Mobile airport had to be placed at least 12 miles from town—Brookley Field is on the bay front on the south edge of Mobile.

The new field covers 801 acres. The area is quite flat so it was difficult to get even a 0.4 percent grade on the ground for drainage. Some of the runways have only a 0.2 percent grade lengthwise. The site was undeveloped pasture land covered with pine trees and live oak. A quick look at the land, without any actual count, would suggest about 60 trees per acre as an average. The soil contains gravelly pieces of iron pyrites. It is a hard red clay with some sand mixed in, but not so hard as to require rooters to loosen it.

Mapping

As first set up, this project was a joint plan between the WPA and the City of Mobile. As sponsor for the project, the city, through the city engineer's office, made all surveys, original designs, and furnished all land and right-of-way. The city also furnished some concrete

New Streamlined Cletracs Pulling Heil Scrapers Help Produce Low Excavation Costs

pipe and grass. The WPA furnished all labor and equipment. The design, prepared by the city engineer, which was submitted to the Civil Aeronautics Authority for approval after that organization was given federal funds to aid civil aeronautic airport construction, was based upon many years experience with the old airport and upon the wind rose developed from weather records kept at the airport as well as those kept by the government. This design planned the main runway to be at an angle of N 18 deg. 30 min. W with the compass. It provided a right angle approach road to the main highway from the airport and a much longer possible runway, if needed.

These designs were worked up from a one foot contour map which the city engineer developed for the entire area. After sumission to the Civil Aeronautics Authority the plan was returned completely changed. The new plan, shown herewith, has a main straight north and south runway and a straight east and west runway. The wind rose shown was developed from weather records of the Mobile U. S. meteorological office and is shown for only 45 deg. directions. The city engineer's wind rose was developed from actual directional records, and therefore showed a slightly different directional prevalence.

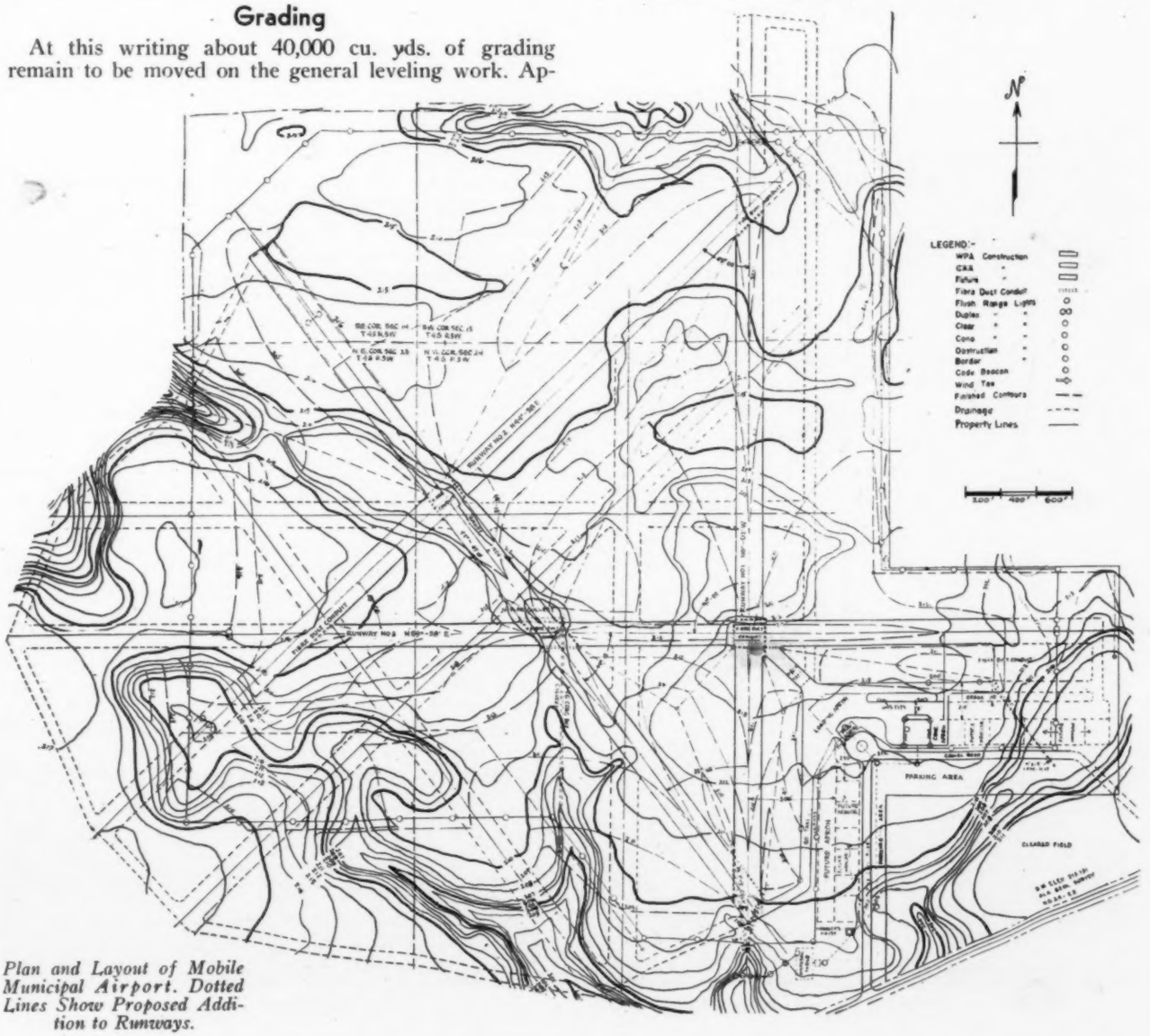
Grading

At this writing about 40,000 cu. yds. of grading remain to be moved on the general leveling work. Approximately 450,000 cu. yds. have been moved to date and the deepest cut has not exceeded 3 feet.

The city engineer established all grades. Runways and warm-up, or parking apron were graded to within 0.1 ft. of finished subgrade.

Cleaning and grubbing started about Jan. 28, 1941. Over 790 acres were cleared at an average cost of $14.40 per acre for clearing and $22.26 per acre for grubbing. It is estimated that about 60 trees per acre from 6 in. down, were removed. Many large stumps left from logging operations were grubbed. All was done with a tractor and bulldozer; no dynamite was used.

Of the amount of excavation moved to date, about 391,000 cu. yds. cost approximately 20 cents a cubic yard, while the rest cost less. This cost includes WPA labor, sponsor's labor, oil, gas, and equipment rental. The equipment rental cost a minimum of $500 per day when not in use. This cost has been called the "bare equipment cost" and is included in the cost per cubic yard. The job was run 10 hours a day, seven days a week except the elevating grader. Since many of the trucks used in connection with the elevating grader were owned by WPA, the drivers could not be worked on Sundays. All other equipment was rented.



Plan and Layout of Mobile Municipal Airport. Dotted Lines Show Proposed Addition to Runways.

Equipment.—Following is a list of the equipment rented and the rates for equipment, operators, and supplies:

Equipment	Rates per Hr. Per Outfit	Operator	Supplies
2 Allis-Chalmers DH14 tractors, towing 2 Gar Wood 12 yd. scrapers	$5.00	$1.37½	$0.75
4 Cletracs FD tractors, towing 4 Heil 12 yd. scrapers	6.00	1.00	1.00
1 Caterpillar tractor, 44 hp. for 90 das. on clearing and grubbing	2.00	.50	.50
1 International FD40 tractor with bulldozer	1.40	—	—
2 J. D. Adams 12 ft. tandem motor graders	1.225	.85	.60
1 J. D. Adams 42-in. elevating grader hauled by Caterpillar RD7	4.40	2.25	1.50
1 Cletrac FD tractor with bulldozer	4.00	1.00	1.00
15 Trucks, 1½ yd. capacity, average	1.30	incl. operator and supplies	
1 Jaeger Concrete Mixer, 7S	.40	—	—
1 Farmall tractor, on grassing	8.74 8 hr. da.	.44	.20
1 John Deere tractor, on grassing	8.74 8 hr. da.	.44	.20

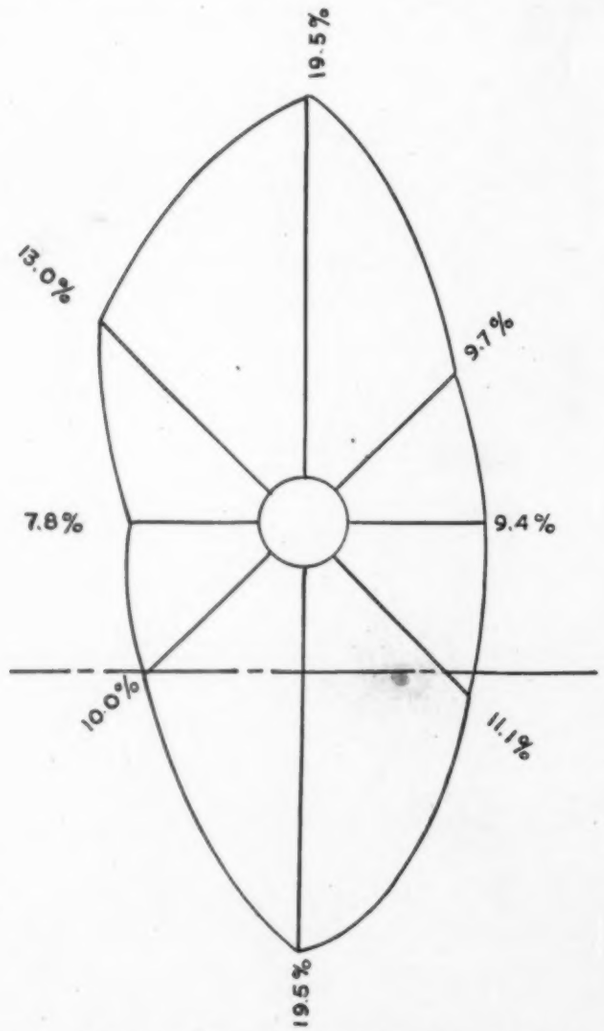
Besides this equipment, the WPA operated about 15 of their own trucks for which they charged the job $0.75 per hour without driver. All equipment was rented on a bid basis. The contractor maintains a greasing truck on the job to service all equipment. About 90 percent of the equipment money was used up without extra costs due to rain.

An average of 150 men are at work on grading, draining and grassing the field. At the peak not over 190 men were on the job.

Drainage.—To date 1401 lin. ft. of 6 ft. by 3 ft. concrete culverts have been built, 650 lin. ft. of 2 ft. 6 in. by 2 ft. concrete culvert, 711 ft. of 36 in. concrete pipe, 384 ft. of 30 in. concrete pipe, and 426 ft. of 27 in. concrete pipe. All joints in the pipe were cemented. These drains are provided to handle surface storm water, no sub-drainage has been designed for the runways or parking apron. Catch basins are placed 25 ft. or so from the edge of the runways so as not to interefere with the 18 ft. runway shoulders to be provided.

Because of the flat turrain and low head room one of the 6 ft. culverts has 4-in. square openings in its top for 30 ft. of length, flush with the ground to act as a storm water catch basin. In recent heavy rains it functioned perfectly.

Grassing.—To date 12 acres has been grassed with Bermuda grass. The soil is fertilized with 4-8-4 fertilizer (4 parts nitrate, 8 parts phosphate, 4 parts potash) at the rate of 300 lb. per acre. Nitrate of soda from Chile is dusted over the top as a "pusher" at the rate of 75 lb. per acre. Sprigs of Bermuda grass are planted in furrows about 12 in. apart, 2½ in deep, made by the fertilizer equipment and covered over. Before long a good ground cover of grass spreads all over.



Wind Rose Developed From Weather Bureau Reports of Mobile. Data Taken at Forty-five Degree Compass Points Only

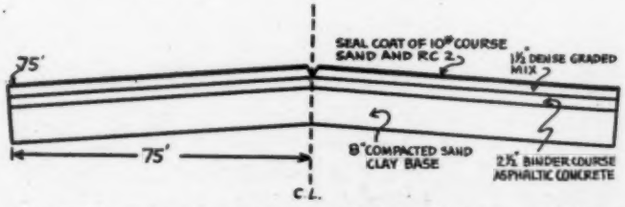
Runways

After the Civil Aeronautics Administration entered the project, the federal government required the Engineer Corps of the Army to handle supervision of the C.A.A. federal aid for airports. Consequently the Army engineers drew up the plans and specifications for the runways, the taxi-ways and the lighting. They also let the contracts. As a result, the city engineer's design of portland cement concrete was changed to 8 in. of compacted sand-clay base upon a well compacted sub-grade. On top of the Grade A sand-clay base will be placed a 2½ in. binder course of asphaltic concrete using 4 to 8 percent of AC-8 after a prime coat of ⅓ gal. per sq. yd. of RT3, tar prime, has cured.

The wearing course will be 1½ in. of dense graded plant-mix using 6 to 9 percent of 85-100 penetration asphalt and the seal coat a cover of RC2 rapid curing cut back asphalt, applied at the rate of 1/5 gal. per sq. yd. and immediately covered with coarse sand or fine chips at the rate of about 10 lb. per sq. yd. The trucks carrying the sand will be operated backward as it spreads the seal sand over the cutback. Hot mixes of the binder and wearing courses will be prepared in standard hot-mix plants and laid at 325 degs F., approximately.

Runways are 150 ft. wide and of variable length as shown by the accompanying plan.

The entry road and loading apron will be built by



Typical Cross Section of Runways. Taxiways Are Same Thickness

Rainy Weather Made Clay Heavy and Sticky

the city of Mobile and will be made of concrete.

An administration building, hangar, and manager's house already have been provided through WPA cooperation.

The runway work let to date to the Southeast Construction Company of Ozark, Alabama, provides for one runway north and south, 150 ft. wide by 4000 ft. long, one east and west runway 150 ft. wide by 3500 ft. long, one taxi strip 60 ft. wide by 1360 ft. long, one taxi strip 60 ft. wide by 1430 ft. long, and one taxi strip 80 ft. wide by 300 ft. long. This work involves the following items and quantities:

Fine grading	sq. yds.	183,400
Excavation	cu. yds.	35,200
Refined coal tar, prime coat	gals.	52,000
Asphaltic concrete, binder course	tons	18,300
Asphaltic limestone-sand, surface course	tons	2,450
Dense plant-mix, surface course	tons	7,300
Asphalt, seal coat	gals.	19,500
Sand, seal coat	tons	560
Pipe, conduit, 4 in.	lin. ft.	5,000

Financial

The total cost of the project is estimated at $980,000. Runway work let to date amounts to $234,424 of this.

The Civil Aeronautics Administration contributed about $143,000, leaving the balance for WPA and the city of Mobile.

Personnel

In direct charge for the sponsor is Mr. Harry L. Fisher, City Engineer, Mobile, Alabama. Mr. L. B. McAdams is Acting District Manager of Dist. 4 for WPA.

Adams Elevating Grader Pulled by Caterpillar Tractor Loads Fifteen to Thirty 2½ Yd. Trucks

Dodge Trucks on Way to Fill

Allis-Chalmers Tractors and Gar Wood Scrapers Work Steadily in the Hard Red Clay in Which "Shot Ore" is Mixed

The U. S. Engineer district is commanded by Col. L. T. Worsham.

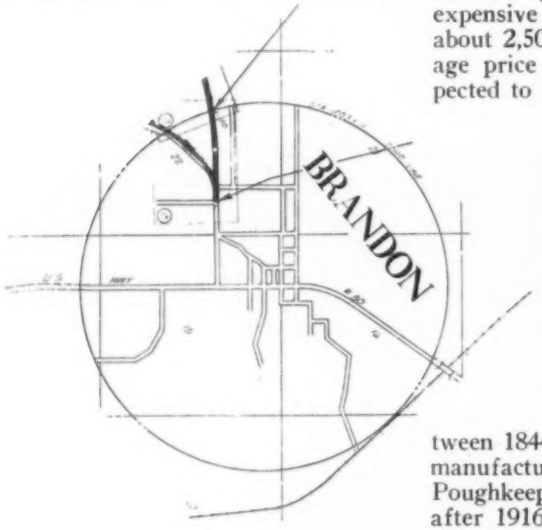
Mr. Royal Randall is general construction superintendent for WPA and Mr. H. A. Lindstrom is field engineer. Mr. Geo. M. Wakefield, the project superintendent for the entire grading operation, kept equipment moving to get the low costs obtained. The grading equipment was rented from the Miller-Williams Company, the Alabama Machinery Company, the Ray Brooks Machinery Company, and J. S. Walton.

Adams Motor Graders Do the Lighter Levelling Work After the Heavy Equipment Finishes

OBSERVATIONS BY THE WAY

By
A. PUDDLE JUMPER

¶ Shown herewith is a town, the only town I know about, which has a perfect circle for a corporation line. The circle has a radius of one mile with the city hall as the center. This is Brandon, Miss. The hearsay story goes that when the railroad



went to enter the town the people objected and established the corporation limit just tangent to the railroad. Hearsay or no hearsay, the limit is a circle.

• •

¶ Showing the substructure design of an economical type of bridge con-

struction. This is the Big Black River bridge on U. S. 61 between Vicksburgh and Natchez, Mississippi. All sway braces and splices are welded. The H-beam piles are driven to 110 ft. penetration.

• •

¶ Did you know that:

The average cost of an automobile tire was $25 back in 1910, and this expensive article would run only about 2,500 miles? Today, the average price is $12, and a car is expected to run about 25,000 miles on one set of tires, which means a cost of 1/20th of a cent a mile, where it was formerly a cent a mile.—The Car.

• •

¶ "In the experience of more than 70 years, in Poughkeepsie, N. Y., only 53 percent of the manufacturing concerns continued in existence more than 3 years. Between 1844 and 1916 there were 846 manufacturing concerns established Poughkeepsie, all of them liquidated after 1916. Of this number, 107, or 12.6 percent, continued in business more than 20 years. Two-thirds of the enterprises failed to continue beyond the 6th year, and ¾ did not reach their 11th year. In a study of mortality in Minneapolis, St. Paul, and Duluth, Minn., from 1926 to 1930, the average age of manufacturing concerns, on closing, was 8 years. —*Domestic Commerce, Dept. of Commerce.*

• •

¶ First concrete road in Missis-

sippi is 9 ft. wide and was built about 1912 or 1914. It is on U. S. 45 near Tupelo.

• •

¶ Convex lenses on the pylons between the roadway curbs provides

flush lighting for the road surface of this underpass on U. S. 49 south of Greenwood, Miss.

• •

¶ Approaches to the main span over Yocona River, 10 miles south of Batesville on U. S. 51, consist of 56—25 foot I-beam spans supported on steel trestle piling of 8-in. H-beams driven to the required bearing of 20 tons. A novel protective feature has been developed at the ground line by means of concrete

jackets extending above and into the ground for approximately 3-feet each way and with the tops laid to grade. Sash and sway bracing members are welded to the piling. Exposed steel in the bent receives a final field coat of black graphite paint, after two applications of red lead paint. Channel caps over the H-beams are encased in concrete. This is an economical bridge design.

Since the discontinuance of publication of the EARTHMOVER AND ROADBUILDER we have been requested to publish the "BORROW PIT," occasionally, in these columns. Herewith is material prepared for the last issue of "The Earthmover and Roadbuilder" which was not published.—*A.P.J.*

BORROW PIT

¶ Man (over the telephone): "Doctor, come quick! My son has swallowed my fountain pen!"

Doctor: "I'll come at once. What are you doing in the meantime?"

Man: "Using a pencil."

• •

¶ Engineer: My, my, are they dancing or wrestling?

Contractor: Dancing, of course! There are some holds barred in wrestling.

• •

¶ There is probably a very good reason why we were given two ears and only one mouth.

• •

¶ She: Shall we stop the car and eat?

He: No, Pet.

• •

¶ An optimist is a man who reaches for his hat when the preacher says: "And finally."

• •

¶ Mrs. Green: I cook and bake for you and what do I get out of it? Nothing!

Mr. Green: You're lucky. I get indigestion.

• •

¶ It doesn't pay to stop, look and listen at a railroad crossing. All you'll hear is the car behind you crashing into your gas tank.

• •

¶ Many a man would like to run his wife for Congress—she's so handy at introducing bills into the house.

• •

¶ A young flapper breezed into a florist shop and looked around the shelves for something she wanted. Spying an old fellow puttering around a plant in the corner she walked over to him.

"Have you any passion poppy?" she inquired.

The old fellow looked up in surprise.

"Gol ding it!" he exclaimed. "You just wait 'til I get through pruning this lily."

¶ Pat: "So you call your goldfish 'Joe.' Does that stand for Joseph or Josephine?"

Mike: "We don't know. That's why we call it 'Joe.'

• •

¶ "What we need in this town," said the theatrical producer, "is something to stir up the public."

"Fine, let's have a woman ride down Broadway on a white horse like Lady Godiva did."

"Boy, that's just the thing. I haven't seen a white horse on Broadway for years and years."

• •

¶ "Have you any last word?" the warden asked.

"Yes," said the man on the scaffold. "Keep your trap shut!"

• •

¶ The major menaces on the highway are drunken driving, uncontrolled thumbing and indiscriminate spooning. To put it briefly, hic, hike and hug.

• •

¶ A gentleman in the optical business was instructing his son in the technique of edging a fair and honest price out of a customer.

He said, "Son, after you have fitted glasses to a customer and the customer asks, 'What's the charge?' you say 'The charge is ten dollars.'

"Then you pause and watch for the flinch. If the customer doesn't flinch, you say: 'That's for the frames; the lenses will be another ten dollars.'

"Then you pause again, but this time just slightly, and again watch for the flinch.

"If the customer doesn't flinch, you say 'Each.'"

• •

¶ We've been trying to figure out the extent of the injuries received by a lady in an auto accident. The account in the daily paper read: "Mrs. Wilson, in attempting to get out of the way of the car, fell to the pavement, injuring her somewhat."

• •

¶ No matter how great a man is, the size of his funeral depends, to some extent, on the weather.

¶ Mail Clerk: The name on this package is obliterated. Does it belong to that new man on your route?

Rural Carrier: No, his name is Smith.

• •

¶ Doctor: Has your husband been taking his medicine religiously?

Wife: You'd never think so if you heard him. He knows all the words, but he uses them in the wrong place.

• •

¶ "Waiter, why is it that there is a trouser button in my soup?"

"I don't understand it, sir. We employ only female help."

• •

¶ Old Maid Aunt: "A popular girl simply can't be too careful nowadays when she goes out with boys."

Flapper Niece: "Heck no, auntie, that's why she's popular."

• •

¶ Dentist: What is that gurgling noise?

Patient: I'm trying to swallow that line you are throwing.

• •

¶ "Yes," said the attorney, "a divorce will cost you $200.00."

"Don't be silly," she replied. "I can have him shot for fifty."

• •

¶ If you have a friend you want to lose, try this riddle on him.

"What's flat at the bottom, pointed at the top and has ears?"

"Answer—a mountain."

"The ears"?

"Come, come—you've heard of mountaineers."

• •

¶ Cat Skinner: "I sent my wife South for the holidays."

Grease Monkey: "What holidays?"

Cat Skinner: "Mine."

• •

¶ Contractor: "The auto is the ruin of the young men of this country."

Engineer: "Well, most young men don't do an auto any good either."

DEVELOPMENT OF TRUCK DESIGN FOR SNOW REMOVAL

WITH the rapid growth of highway travel and transportation in recent years, and the greatly expanded network of the nation's hard-surfaced roads, the problem of keeping traffic moving during winter months has become increasingly important. Only a few years ago many highways in our northern tier of states were totally impassible for several months each winter, due to deeply drifted snow. Few indeed are such blockades today, and much credit must be given to the enterprising and courageous men who make up the highway crews which are entrusted with the job of battling Old Man Winter to a standstill, keeping our roads and streets open for continuous traffic.

Contrary to the opinions of many "old timers," who claim that "our challengeable records that the average snowfall is just about the same year after year. It isn't that we have less snow, but because we have better ways of combating it, which makes the job easier.

It was along about 1925 that the legislators of our snow problem states began to appreciate the economic value of maintaining uninterrupted year around travel and transportation over highways throughout the year and larger appropriations were made to highway commissions for obtaining snow removal equipment.

A Rotary Snow Plow Can Be Handled by An All-Wheel-Drive Conversion of a Standard Mass Production Truck—A Marmon-Herrington in This Instance

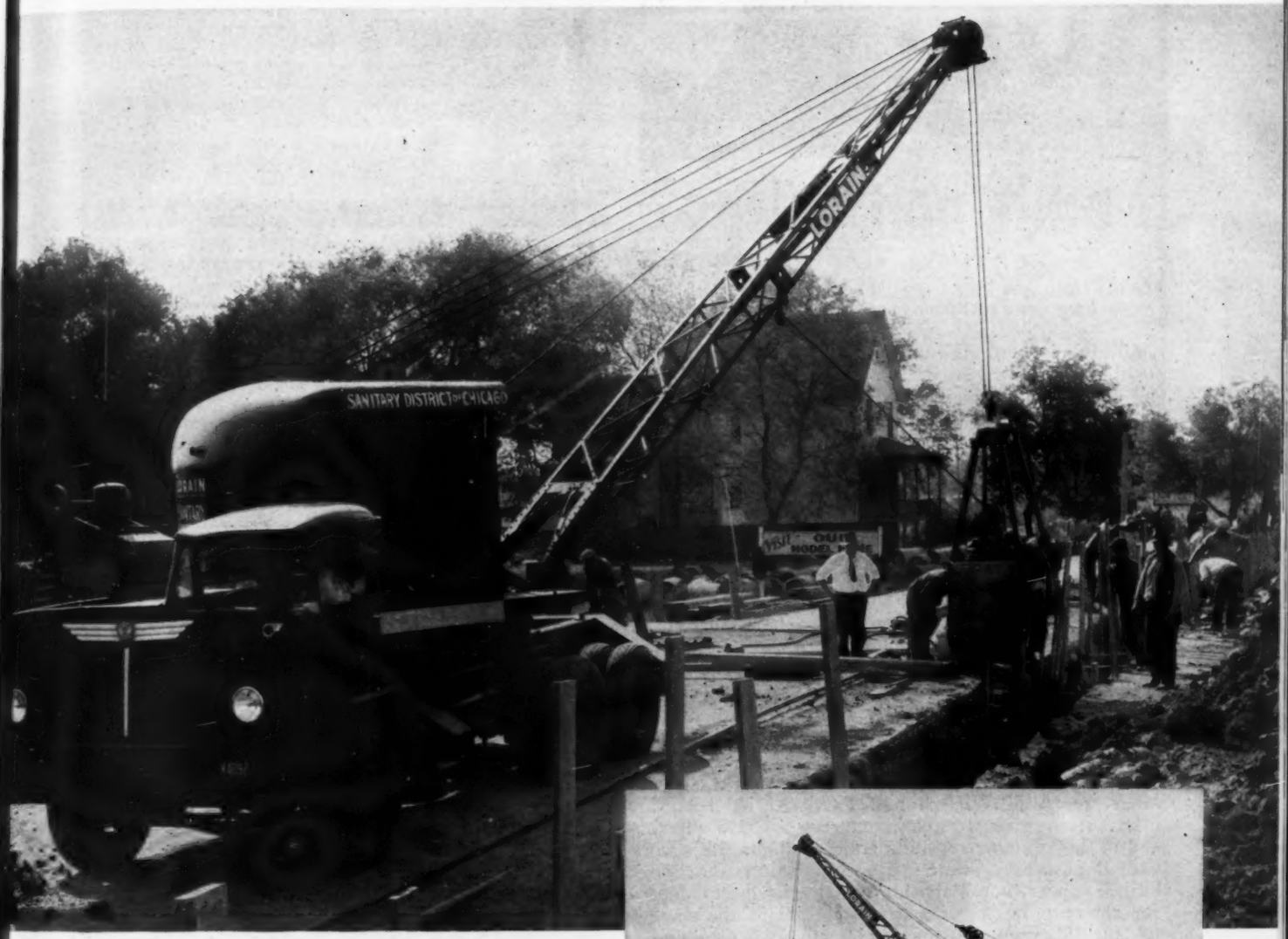
Equipment Types

Many snow plows were designed and tried in an effort to overcome the difficulties which became immediately apparent. The first successful plow was the bulldozer type of V-construction. With this type of plow, the snow was rolled up and out at very slow speeds since the available truck equipment was powered with fifty to sixty horse power engines and with chassis weights ranging from nine to ten thousand pounds. With this combination of heavy gross weight and slow maximum speeds only a limited milage could be serviced in snow removal with each unit.

By 1930 it became evident that in order to plow snow, using truck equipment, with a reasonable degree of success it was necessary to apply power and traction through all of the wheels of the vehicle. With the drive on all of the wheels it was possible to control the direction of the vehicle with the snow plow and to minimize sideslipping and skidding when operating in snow drifts ranging in depth from three or four inches on one side of the road to four or five feet on the other. All-wheel-drive propulsion provided the necessary traction and force to "push through." In the winter of 1934-35 the first conversion of a standard mass production truck to all-wheel-drive was successfully accomplished. This helped to lower the costs of snow removal. In the meantime, other manufacturers were producing their standard four wheel drive units and gearing them to snow removal work. Standard trucks with power at all of the wheels have been enthusiastically received and widely used by highway departments. For light snows, light truck equipment reduced vehicle operating costs and the higher rates of speeds with which the lighter vehicles could be operated resulted in much faster snow clearance. Many more miles of highways could be cleared of snow (which could be handled by the lighter equipment) in the same period of time than with the heavier equipment. By getting out on the roads with these lighter, faster snow

Snow Plowing Such As This Which Is Typical County Work in the Northern States Demands That the Truck of Today Have Both Power and Traction

For ROADS AND LOADS



Power shovels that GO under their own POWER

Not so long ago power shovels were figured only in terms of how much they could move and how quickly they could move it. Now, thanks to recent modern manufacturing advances, these are not the only important measures of merit . . . There's the additional, important factor of *how quickly* and *how far* the shovels themselves can go under their own power! You'll be seeing more and more shovels and cranes, mounted on extra heavy 6-wheel chassis with Timken Front and Timken Tandem Drive Rear Axle Units, speeding over the highways — saving time between jobs, making more money for their owners. Timken builds the husky "6-Wheelers" especially suited to the roads and the loads encountered in power shovel duty. And you will be wise to investigate shovels or cranes on Timken "6-Wheelers" before you make your next purchase.

★ TIMKEN AXLES ★

THE TIMKEN-DETROIT AXLE COMPANY, DETROIT, MICHIGAN • WISCONSIN AXLE DIVISION, OSHKOSH, WISCONSIN

Plowing Drifts 4 to 5 Fe.t Deep Would Have Been Impossible for Trucks of Ten Years Ago But Not Today's Models

removal units with the first snow fall, it was usually possible to keep the road clear through the deep drifts, and by means of high speed operation to throw the snow beyond the drift line. But deep drifts are frequent enough to require some heavy equipment.

Snow plow manufacturers were prompt in adapting their plow fittings to new model vehicles. As a result of this it was possible to purchase an all-wheel-drive converted truck or any standard all-wheel-drive truck with V-plow for operation on narrow township or county roads, or with V-plow and one-way blade interchangeable on the same hitch for state highway service.

The first mass production truck to be converted to all-wheel-drive was the standard Ford of one and one-half ton capacity. These conversions were made by the Marmon-Herrington Company. Their successful performance is due in part to the fact that Ford engines develop their maximum torque at somewhat higher speeds than other engines.

Successful performance of the heavier trucks, such as Mack, Walter, F.W.D. and International, has been due to the study given by manufacturers to snow plowing and to the economy resulting from combining this work with their use as prime movers an maintenance work in the summer time. Particular gearing has been adopted for rotary plows by the larger as well as the smaller units so that they will function effectively in deep drifts. Special final drives and gearing are also available for all standard trucks for snow removal work or other construction work where no road is available to the worksite.

Where deep drifts are common, as in the mountain states, there is always a need for heavy vehicles with drive on all of the wheels in snow removal service. For light snow removal jobs the all-wheel-drive conversions of standard mass production trucks serve the purpose required.

ASK FOR CONTINUATION OF FEDERAL HIGHWAY POLICIES

(Continued from page 39)

The western states are covered by vast tracts of Government owned and controlled lands. In certain states 70 to 80 per cent of the entire state is taken up by the above. Further, these western states are sparsely settled, and find it necessary to build large mileage of highways through United States owned property.

The western states have been notified recently that the Federal Lands moneys given them by the Congress of the United States have been partially withheld by someone in authority in Washington, D. C. The President of the Western Association of State Highway Officials is instructed to ask the proper authorities in Washington that this Federal Lands money be returned to these states in the full amount of the authorizations.

That the Western Association of State Highway Officials oppose any further increase in road use taxes by the federal government, unless some is returned to the states through federal aid, to be expended for highway purposes.

For the past twenty-five years, through cooperation between the State Highway Departments and the Public Roads Administration, there has been constructed in the United States a system of highways which is outstanding in the world. However, there is an apparent tendency on the part of other agencies to expand a duplicating agency to carry on similar types of heavy construction work.

But since through the present cooperative arrangement between the State Highway Departments and the Public Roads Administration there has been developed a trained engineering personnel and organization competent to properly, expeditiously and economically carry on highway building activities.

"Now, Therefore, Be Iit Resolved, That the Western Association of State Highway Officials representing the highway construction activities of the twelve western States does hereby vigorously oppose any change in the fundamental procedure, organization and methods of allocating funds and designating road systems and mileage; and

Be It Further Resolved That it is the considered opinion of this Association that any and all Federal funds in the future to be used for highway construction should be expended through the State Highway Departments and the Public Roads Administration and no other Federal Agencies."

J. M. MARSHALL GETS NEW POST

The American Institute of Steel Construction has appointed Joseph M. Marshall, Jr., as district engineer with headquarters at Atlanta, Georgia. Mr. Marshall will represent the Institute in the territory embracing Virginia, Eastern Kentucky, North Carolina, South Carolina, Tennessee, Georgia, Alabama and Florida. The Institute maintains other district engineers with headquarters at Worcester, Mass.; New Orleans, La.; St. Louis, Mo.; San Francisco, Cal.; Philadelphia, Pa., Cleveland, Ohio; Chicago, Ill.; Topeka, Kans., and New York City.

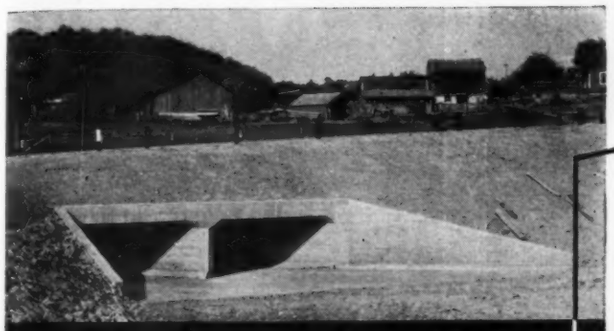
Prior to coming to the Institute Mr. Marshall was engineer inspector for the PWA in Georgia. He graduated in Civil Engineering at Virginia Military Institute, and was engaged in construction work with the Seaboard Air Line and the Pennsylvania Railway. Mr. Marshall served as captain in the Eleventh Engineers in France from July, 1917, to January, 1919, and after the first World War was employed as field engineer for the Portland Cement Association.

NEW MANUAL OF INSTRUCTIONS

The Texas Highway Department has recently issued a Manual of Instructions devoted to highway marking. This book covers primary markers, secondary markers, special markers, and barricades. The index makes for easy reference to any subject in connection with signs or markers from the selection of the lumber, metal, or paint to the placing of the sign on the roadside and the location and painting of traffic stripes.

Maintenance painting is covered in a separate chapter. Here are found directions for maintenance, bridge painting, equipment painting as well as sign painting according to the standard practice of the Texas Highway Department.

Special mention of this manual is made to recognize the work of a group of men who contribute so much to safety and peace of mind of the highway user.



9 DAYS SAVED—FORM COSTS CUT

▶ This culvert, with three others and a bridge, was built on Route 56, Vernon County, Wisconsin, early in the spring. Use of Atlas High Early permitted stripping of forms and opening of road to traffic 5 days after concrete was placed instead of 14 days if normal portland cement had been used. Form costs were cut by earlier stripping and also re-use of forms and protection and curing costs reduced appreciably. Engineer, Wisconsin State Highway Commission; Contractor, Nelson, Mullen & Nelson, of Minneapolis.

SAVED $3 PER CU. YD. OF CONCRETE

▶ To meet winter construction problems, the Minneapolis Bridge Co. chose Atlas High-Early for 1700 sq. yds. of paving, 280 sq. yds. of sidewalk, and the retaining walls and deck of this Northern Pacific underpass, Bismarck, N. D. The contractor reported that lower costs for protection and curing saved $3 per cu. yd. This large saving was partly due to the necessity of placing the concrete in a number of operations—no one placement of concrete exceeding 30 cubic yards.

SAVED 10 DAYS AND FORM COSTS

▶ Use of Atlas High-Early cement on the Blue Ridge Parkway Project in Boone, N. C. enabled the subcontractor to save ten days in construction of each culvert. Also forms were stripped in 3 days instead of 14 days. This permitted re-use of forms, resulting in a large saving in costs. Contractor, Nello L. Teer, Durham, N. C.; Subcontractor, J. H. Brinkley, Thomasville, N. C.

Lop days off construction time

CUT DOLLARS OFF COSTS— *with* ATLAS HIGH-EARLY CEMENT

HOW to speed construction and reduce costs—here is a problem that Atlas High-Early cement answers satisfactorily on many jobs. The three jobs here illustrated are typical.

Atlas High-Early gains strength rapidly, and so cuts time and costs required for protection and curing as much as 60-70%; generally permits earlier stripping and re-use of forms, thus often reducing form costs; and produces serviceable concrete in much less than the usual time.

Specify Atlas High-Early on your next job. Fill out and mail the coupon below for new booklet, "Case Histories of Days and Dollars," which gives further data on the speed and economy of Atlas High-Early cement. Universal Atlas Cement Co. (United States Steel Corporation Subsidiary), Chrysler Building, New York City; 208 South La Salle Street, Chicago.

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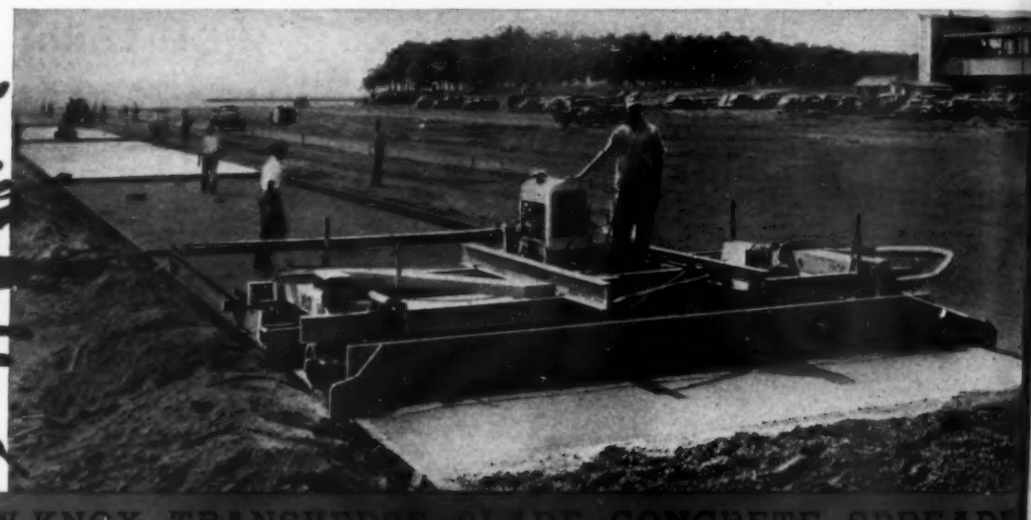
This new model finishing machine has greater flexibility of design and operation to handle low slump concrete and better meet variable field conditions.

GOOD NEWS INDEED for defense contractors who must pave in a hurry. New Blaw-Knox Finishing Machines and Concrete Spreaders are hard at work on various defense projects, a few of which are: the Boise (Idaho) Airport; Wendover Airport (Utah); Gunter Field (Ala.); Jefferson Proving Ground (Ind.); Glenn L. Martin Aircraft Plant (Md.); Yakutat Airport (Alaska); Sunset Airport (Wash.); Trans-Isthmian Highway (Panama); Kingsbury Ordnance Plant (Ind.); Vultee Aircraft Plant (Tenn.); Naval Air Base (Fla.); Mobile (Ala.) Airport; Hamilton Field (Cal.) Airport; Scott Field, (Ill.)

PAVE AT TOP SPEED



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Paving contractors like BLAW-KNOX AUTOMATIC TRANSVERSE BLADE CONCRETE SPREADERS. That's why four times as many Blaw-Knox Spreaders have been sold as all other makes combined, since they were introduced and put into service early last year.

SPREAD CONCRETE MECHANICALLY: — Blaw-Knox CONCRETE SPREADERS, equipped with an automatic transverse spreading blade, easily handle the top output of any paver . . . will spread concrete without segregation . . . will spread concrete as dry as ½ inch slump . . . will spread concrete without disturbing road form alignment . .

Dump concrete anywhere on the subgrade and the spreader does the rest — the spreading blade action is automatic.

Blaw-Knox Concrete Spreaders can be changed from narrow (single lane) to full width or vice versa by purchase of change parts. This cannot be done with any other concrete spreader.

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...THE NEW MODEL Blaw-Knox FINISHING MACHINE

MODEL XB . . . gas driven
Up to 4-foot Width Adjustment available

HAS EXCLUSIVE FEATURES

- FOUR working traction speeds, and TWO travel speeds—SIX speeds forward and reverse.
- FOUR screed speeds.
- UNIT AUTOMOTIVE TRANSMISSION drives traction, screeds belter, and tamper or vibrator.
- SPECIAL WHEEL EQUIPMENT for multiple lane construction of airport runways and aprons.
- REMOVABLE WHEEL RIMS for quick wheel change.
- STRONGEST structural frame of any finishing machine ever built. One piece cross members—no splices. Design provides better weight distribution with elimination of 1000 lbs. excess weight—easier on the forms.
- WIDEST screed ends—keeps concrete between forms.
- FOOT PEDAL STEERING and braking.

5 YEAR GUARANTEE ON STRUCTURAL FRAMES AND WHEEL AXLES

Other features of the new MODEL XB BLAW-KNOX FINISHING MACHINE include

—Self-aligning ball bearings for screed drive.
—Accurate quick adjustable front screed for rapid crown change.
—Fast power operated hydraulic screed lift.
—Efficient wheel cleaners.
—Quick and convenient transportation wheels.

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EDITORIAL

DUMB OR CROOKED?

APPARENTLY the counties of Texas opened their mouth and put their foot in it. The official leadership of the Texas County Judges and Commissioners Association apparently preferred that the bill providing for state redemption of county bonded indebtedness for old highway work be killed rather than yield their viewpoint to a majority of the conference committee of the Texas Legislature appointed to reconcile differences between the House and Senate, or to accept the bill substantially as it passed the Senate. The bond assumption bill failed to pass at the recent regular session.

Just why the county organization would rather jeopardize the financial credit of some counties and cause increased county taxes in order to bullheadedly retain their viewpoint is not entirely clear to the writer.

Back in 1932 the legislature passed a law which set aside one cent of the state gasoline tax collection, *which formerly was revenue for the state highway fund,* to pay the principal and interest, as it matured, on outstanding bonds that had been voted by counties and road districts to assist in financing state highway construction. The original intent of the bill was to give relief to the counties so they could lower property taxes. It relieved the counties of the burden of meeting bond payments. *At no time since the original act was passed,* up until this legislative session, *had there ever been any effort on the part of anyone to do anything that would tend in any way to disturb the original purpose of the bond assumption act.* Since the state constitution prohibits the legislature from making an appropriation for longer than two years (and the bond assumption bill is essentially an appropriation bill) it has been necessary for the legislature to re-enact the law every two years to permit the state to continue to make payments on the county and road district highway obligations.

It was only after the income from the one cent exceeded the amount needed to service the outstanding bonds that a controversy developed. To date the state has paid, or has made arrangements to pay, in full, all maturing principal and interest from the date of the original law even though for a few of the first years the income was insufficient annually.

The sole point of major issue at the recent legislative session concerned the disposition to be made of the surplus from the one cent of the gasoline tax after the state had fully met these obligations.

During the controversy two main plans developed:

1. A plan, supported by the official group of The Texas County Judges and Commissioners Association, to split the surplus now accruing in the one cent bond assumption fund among the respective counties of the state on a formula basis, each county share to be available for payment of principal and interest on lateral road bonds issued by county or for construction of additional lateral roads.

2. A plan to return this surplus to the state highway fund for the construction of the main highways, with particular emphasis being placed at this time on the need for additional revenues to bring the state highway system to a condition where it could more adequately serve the greatly increased demands placed on arterial routes by the vastly expanded motorized and mechanized army and to provide more adequate facilities for the augmented traffic generated by the industrial defense program.

Two other variable arrangements of these plans were proposed because of previous work by certain counties.

The House passed a bill supporting the official viewpoint of the county judges association. The Senate passed a bill to return the surplus to the state highway system..

The legislative committee tried over a period of several weeks to reach an agreement.

One proposal made to the conference, which seems to the writer to have been the most sensible suggestion of any offered, was flatly rejected by the conferees representing the bull-headed, futile, all-or-nothing policy of the County Judges and Commissioners Association. This proposal was that one-half of the surplus be matched by the federal appropriation of $1,250,000 for farm-to-market roads and be allocated for the construction of a "farm ranch road system" under the supervision of the highway commission with the remaining one-half of the surplus to go on state highways. In connection with this suggested compromise it is important to note that no road which was being maintained as a state highway on January 1, 1941, would have been eligible for any of the funds allocated to the "farm ranch road system."

What the conferees report finally contained on the last day of the legislative session is not important now because, while it was finally passed, after some alterations, by the Senate, it was rejected by the House. It It met heavy opposition in the House on the part of the recognized floor leadership of the County Judges and Commissioners Association and the floor leader for this group made the motion to kill the conference report.

Failure of the legislature to re-enact the Bond Assumption Law leaves the fiscal affairs of virtually every county in a precarious position. In some instances the situation will be desperate as some of the counties will be required to increase their tax rates beyond the ability of the taxpayers to pay, or default on their bonds. It is probable that many counties will engage in refunding operations to refund the payments that are about to fall due. The writer loathes to present the suggestion that perhaps the fine hand of the bonding interests might have persuaded the bull-headed attitude of the counties. It has been done, and not very far from Texas.

Since adjournment of the legislature, widespread demands have been made for a special session to again consider the subject. No prediction can be made at this time regarding the special session. Since Governor O'Daniel was elected to the United States Senate, the decision on a special session will rest with Lieut. Governor Coke Stevenson who will become governor. Mr. Stevenson was the author, while a member of the House, of the original bond assumption law. He always has expressed the conviction that the *intent of the original law was solely to relieve the counties of the payment of bonds voted for state highways and that the legislature contemplated that when the one cent of the gasoline tax had served this purpose, the income from the one cent would be returned to state highway construction,* from which it had been diverted primarily to assist the counties.

It appears, therefore, that the counties opened their mouths and put their foot in it. Or, could there be any ulterior motives by anyone? Perish the thought!

Sensible county attitude is mandatory for the relief of county taxpayers. A new leadership is in order.

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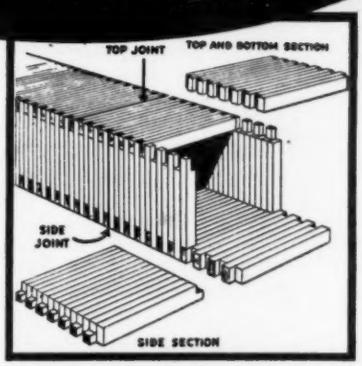

This illustration shows construction and assembly. Sections are approximately 4 feet in length. Standard culverts have a sloping head-wall, parapet, and underground curtain wall at each end.

*Trade-Mark

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CONDITIONS ALTER CASES

CONTRACTS usually provide for liquidated damages in case a contract is not completed on time. The access road to Camp Polk, near Leesville, Louisiana, was let on a calendar day basis, 5 miles to be completely graded in 60 days. The route was through new location and at the time, the weather was fine.

No sooner had the contractor gotten well started than a series of rainy days occurred. The contractor put enough equipment on the job to complete the whole project in 30 days, organized as he was, yet his contract completion date has long since expired.

Here is a case of whole-hearted intent on the part of the contractor to cooperate in rushing a national defense project. He bid a price for dirt which he would have to manage well to meet even without the pressure of a rapidly approaching contract expiration date.

Rainy weather continued for a long spell during the contract period, causing so many delays that the project was quite a long ways behind on expiration date.

The contractor is taking a loss which he should not be allowed to stand. He fought mud, rain, and sticky clay in his determination to fulfill his contract.

The extenuating circumstances under which he worked certainly justifies a time extension to the contract and the good faith he showed in massing equipment and man-power to do the job should certainly offset any desire to load him down with "liquidated damage" charges.

A man to man understanding would suggest return of his certified check, extend his contract time, and avoid all effort toward charging liquidated damages against him. A look at the 40-cent dirt that was bid at 26 cents will quickly aid one to make a reasonable decision as to procedure to follow.

TIRES OF SYNTHETIC RUBBER

IN RECENT months we have been asked on numerous occasions if we believe that synthetic rubbers will be used in automobile tires. It is a question we have not been able to answer directly. However, a recent statement on the subject appeared in The Neoprene Notebook, a small booklet put out periodically by the Rubber Chemicals Division of E. I. DuPont De Nemours & Co. This publication is devoted to technical information for engineers.

In answering the question "will automobile tires be made of Neoprene?" the editor of Neoprene Notebook writes as follows:: "At the present stage of development, the use of neoprene will add little to the life of tires used on passenger cars under normal service conditions. However, if the supply of crude rubber from the Far East were interrupted or cut off, neoprene and other synthetic rubbers would necessarily be used, to the extent they are available, for passenger car tires, even though the tires would cost more and wear little better than those made of rubber. . . . Neoprene-surfaced tires will outlast rubber tires on tractors and on road building equipment where the tires are not protected against direct sunlight, where the tires run over oily ground, where they are subject to extreme cutting, under unusual heat conditions, etc.

"In this rapidly changing world prophecy is difficult. Frankly, we don't know the future for neoprene tires."

The editors of ROADS AND STREETS believe that the answer to the question as far as the highway industry is concerned hinges on whether the use of tires made of synthetic rubber or surfaced with it will result in a lower operating cost for the equipment. Disregarding the possible scarcity of rubber for the moment, we can say that a lower operating cost will result in a wide demand for the use of synthetic rubber in tires used on road building equipment. If the operating cost goes up there will be no demand for tires using such material and only the scarcity of rubber will make the use of synthetic products general in this industry.

A TOUGH SPOT

THREE problems are going to clash with each other for first place attention of state highway department this year and next. They are (1) Peace time highway needs, (2) Strategic highway requirements, and (3) Access road demands and the demands of roads in the areas of access roads.

The last two are acute, made so by the urgency needs of national defense. The first may be scheduled in orderly fashion as indicated by the results, or deductions from studies made, of the statewide highway planning surveys. The second is pressing from the point of view of a "full national emergency" and the need to defend the United States. The third is acute and is daily creating a greater amount of required work. Some camps, for example, virtually transform a countryside into a large city. The traffic problems of a large city are magnified because no large stores are established in the camps. Inventories are supplied more frequently and emergency business trips occur oftener during the day.

State highway administrators have a big problem on their hands in attempting to satisfy traffic needs with the meager, limited funds available to them.

What to do?

Provide the funds in necessary amounts. The 320 million dollar defense highway bill just vetoed by the President would have helped considerably to remove bottlenecks, to strengthen bridges, and to place the strategic network in a good condition. The Defense Highway Bill must be passed over the President's veto. The apportionment formula must remain.

POLITICAL INTERFERENCE AGAIN

LOCATION of the National Road, U. S. 40, was embroiled in politics during President Jefferson's administration as badly as maintenance of the same road now is in Ohio. A clipping from the Cleveland Press of June 18 states that the "G.O.P. Heads Force 400 to 'Sell' $5 Ticket Books."

"Hundreds of State Highway Department workers in this section had a two-edged complaint against the department today," the Cleveland Press stated. It claimed that all workers were forced to lay off for the day—without pay—and attend the division's annual picnic at the Lake County Fair Grounds. And all were given $5 books of tickets for the picnic with instructions to sell, buy or dispose of them." The Press goes on, "Orders to load workers with the $5 books of tickets came, it was reported, from Jack Fleur, secretary to Highway Director Hal G. Sours."

Engineers get into politics and take politics directly into their work. When actions like the above are taken one wonders how much true engineering governs the expenditure of highway funds. Doubt is raised in the lay mind and mistrust that engineering principles and economics are being fairly applied. Ohioans, however, are probably case hardened to political engineering.

Reinforce with WIRE FABRIC for GREATER STRENGTH and DURABILITY!

RECORDS of long-lasting installations have proved the outstanding dependability of American Steel & Wire Company Wire Fabric as the ideal reinforcement for concrete pipe. Low first cost, low-installation cost and durability are marked advantages of this Wire Fabric. Its ability to aid in load distribution and to withstand heavy stresses makes it first choice for longer pipe life, greater efficiency and economy.

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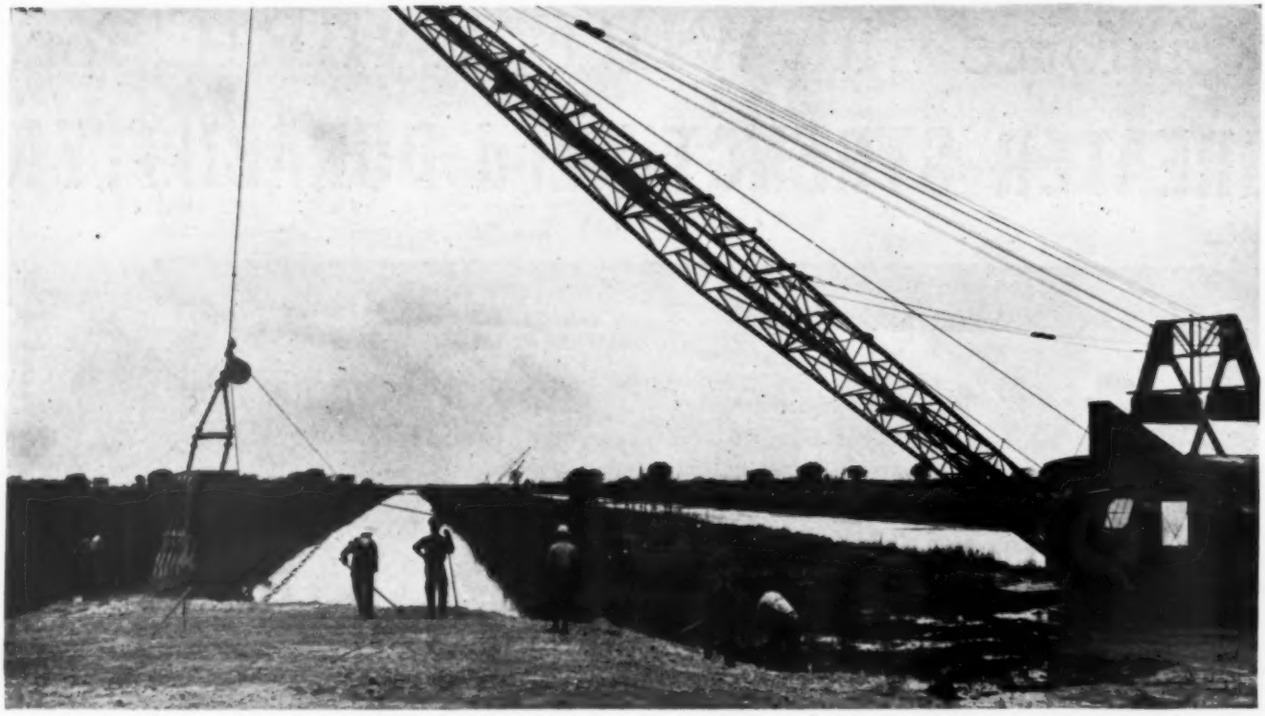
UNITED STATES STEEL



Looking South on Project 241-B. In the Distance Draglines Are Excavating Muck. In the Middle Distance a Drill Rig Is Working in the Canal. In the Foreground a Bucyrus-Monighan Machine Is Placing the Lime Rock Roadway Fill

MODERN HIGHWAY THROUGH FLORIDA'S EVERGLADES

Construction, Just Completed, Offers Many Problems for the Contractors

By J. H. DOWLING
State Highway Engineer
State Road Department of Florida

JUNE 1941 marked the completion of another outstanding and important link in the highway transportation system of Florida when the last section of the Will Memorial Highway (State Road No. 26), upon which construction work was started in August, 1932, was opened to traffic.

Named in honor of the late Dr. Thomas E. Will, former Harvard Professor, who spent the latter years of his life in promoting the development of the Okeechobee area, the 85 miles of highway connect the southern shore of Lake Okeechobee at the town of South Bay with the East coast at Fort Lauderdale and Miami. It is a modern 22 foot pavement on a 34 foot wide limerock embankement running along the North New River Canal through the heart of the Everglades sawgrass country. As this fill rests upon solid limerock and the eleven foot embankement material consists of practically pure limerock, this is believed to be one of the most enduring roadway embankments ever constructed. As is shown in the accompanying sketch, the road is remarkably free of horizontal curves. The longest tangent begins a few miles South of Okeelanta and runs about 25 miles before making a turn. Approximately $4,000,000 of Federal, State and county funds were expended over a period of nine years in completing the project which is of great economic value to the region.

Economic Importance

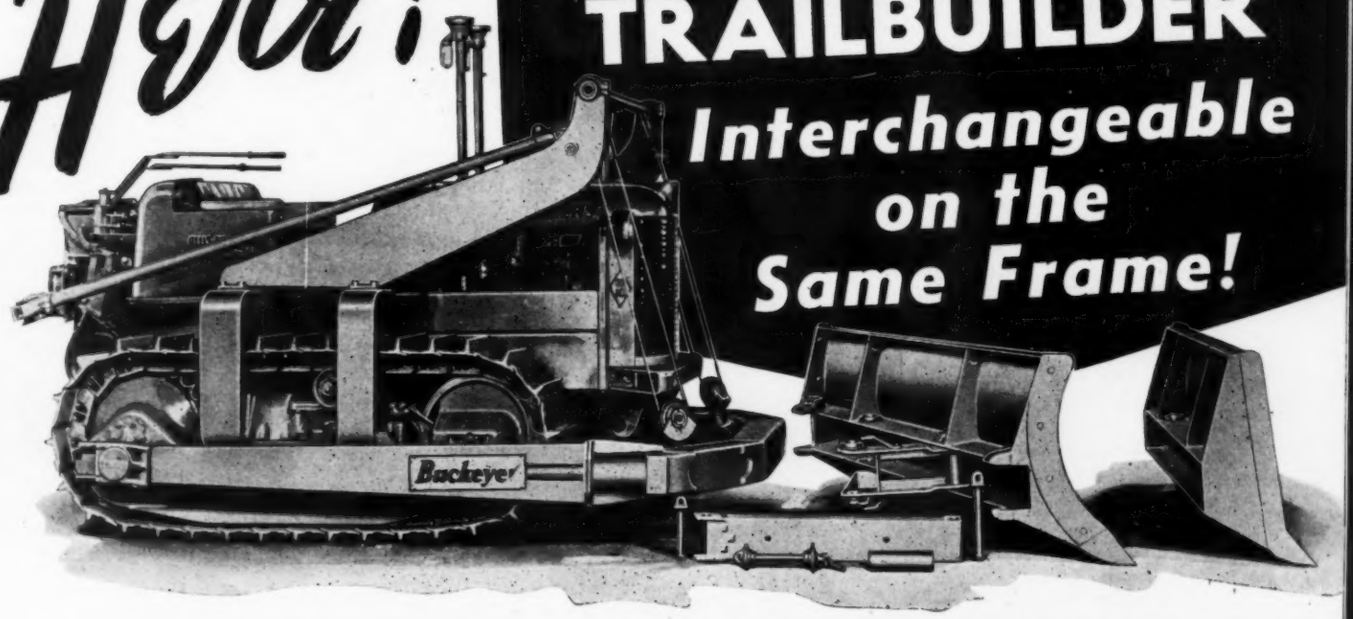
This new highway provides a third route of an ingress and egress to Miami, and is the Southern leg of a route, through the central section of the State. Motorist desiring to enter or leave Miami via Central Florida will find that this road offers much relief from the heavy traffic on the urbanized East coast. From South Bay it is a 72 mile drive to Miami and a 55 mile drive to Fort Lauderdale. The new route effects a 43 mile saving in distance from Lake Okeechobee to Miami.

Outstanding from an economic point is the fact that the highway provides the extremely fertile winter vegetable and sugar cane area around Lake Okeechobee (where the soil is capable of producing as many as three bean crops in one season) with direct access to Port Everglades and the lower East Coast. From Lake Okeechobee to Fort Lauderdale, the road follows the southwest side of the North New River drainage canal and the embankment is constructed from limerock taken from the bottom of the canal. Construction included widening the canal to a minimum of 40 feet and to a

It's Here!

Buckeye UNITILT BULLDOZER and TRAILBUILDER

Interchangeable on the Same Frame!



1. INTERCHANGEABLE BLADES ON UNITILT FRAME—You buy only one frame! The Buckeye UNITILT frame is universal for Buckeye Blades! Changing from Bulldozer to Trailbuilder blade or vice-versa is quickly done by one man pulling two kingpins.

2. EASILY TILTED—Tilting of the blade requires the adjustment on the frame of one bolt only to raise or lower at either end! The only interchangeable unit that will tilt a Bulldozer blade!

3. BLADE ROLLS THE DIRT—Rolling action of blade enables operator to take deeper cuts because the load is rolled up ahead and not pushed ahead—no dead weight — less power required — bigger "payloads" — moves faster—less strain on tractor—blade digs its own way in—no cylinders needed for down pressure.

4. BLADES HUG FRONT OF TRACTOR—Bulldozer and Trailbuilder blades hang close to radiator, greatly reducing load and wear on front idlers and track rollers. Note rigid, close-coupled construction.

5. TRAILBUILDER EASILY ANGLED — It's a simple operation to install the extension to either side arm to angle the blade either way. A second member is also installed to give greater rigidity.

6. FULL FLOATING BLADE—Side arms pivot at drive end of tractor—free-swinging action up or down for high lift and deep bite of blade. Buckeye cable control gives tremendous power and lightning-fast action!

7. BALANCED TO UTILIZE FULL TRACTOR POWER—Full lengths of crawlers stay on the ground—no lost traction—maximum pushing power assured—mechanical downward pressure not required—no cylinders for pushing blade down and tipping tractor up.

8. CABLE CONTROL—At its best with Buckeye Power Control Units—smooth, fast action with no jerk on the line, greater lifting power, simplicity and freedom from trouble!

9. RUGGED FRAME—Stout sidearms and fully braced front cross beam—a brute for the punishment of the toughest job!

10. CLEAN CUT DESIGN—No overhead frames to obstruct vision — simple, rugged design — no lost motion between members—long-wearing.

COUNT the Buckeye features that spell more yardage per day and bigger profits on any 'dozing job. There's a Buckeye UNITILT frame with Bulldozer and Trailbuilder moldboards for your tractor. Write for literature today.

BUCKEYE TRACTION DITCHER CO., Findlay, Ohio

Built by Buckeye

Convertible Shovels

Trenchers

Tractor Equipment

R-B Finegraders

Road Wideners

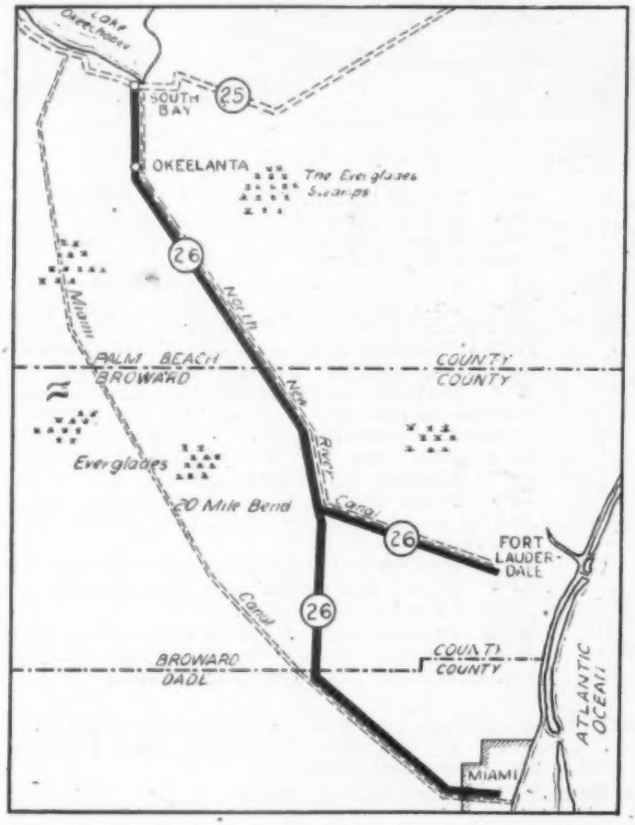
Spreaders

depth of 12 feet below water level, which has added considerably to the drainage facilities of the Everglades area. The canal can be made to provide a navigable channel for inland water transportation.

Interested parties have been promoting the drainage of the Everglades swamps for a long time, and governmental and private projects have been instigated toward that effect. When this is accomplished a large part of the winter vegetables for the dining rooms of the nation can be supplied from the Everglades.

Scope of Job

The Everglades area in which the road is located has a subsoil of practically pure lime rock which is sediment of the Cenozoic Sea that covered Florida many million years ago. On this limerock subsoil, a mucky peat has accumulated and sawgrass grows on top. To construct a serviceable and permanent road, it was necessary to remove the muck and fill in with a stable material. Two possible locations for the road were the North New River Canal and the Miami Canal (shown in accompanying sketch) which were dug by the Everglades Drainage District. The North New River Canal location was selected because along its route the muck was not as deep, and because of the availability of spoil banks of lime rock at the northern end.



Map Showing the Location of the New Construction on Florida Route 26

Constructing the embankment included (1) removal of muck down to bare rock and to the width of the road bed, (2) excavation of a canal approximately 50 feet wide (40 feet minimum) and to a depth of 17 feet below the elevation of the crown of the road (approximately 12 feet below the water or ground level), and (3) constructing a roadway embankment 34 feet wide and approximately 5 feet above the original ground elevation with the rock excavated from the canal. Surfacing was effected by shaping and compacting the upper layer of the embankment, and applying a bituminous surface wearing course. A separate base course was not necessary.

State forces constructed the southern 17 miles in Dade County from the Broward County line into Miami. On this latter section the muck was very shallow, ranging from two to four feet. This section was completed and opened to traffic in 1936.

Grading

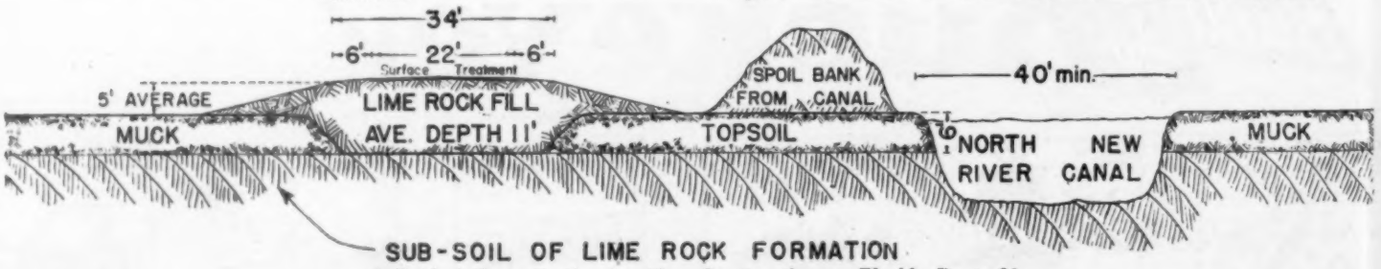
In addition to the grading performed by State forces on the section in Dade County, eight contracts were let to six different contractors, as follows:

County	Project No.	Length	Contractor
Palm Beach	168-D	3.90	Atlantic Dredging and Construction Company
Palm Beach	168-A	2.33	Spadaro Construction Co.
Palm Beach	168-B	10.04	George D. Auchter Co.
Palm Beach	168-C	9.95	George D. Auchter Co.
Broward	241-A	14.68	Badgett Construction Co.
Broward	241-B	12.95	George D. Auchter Co.
Broward	123-A	6.70	Faulk and Coleman
Broward	123-C	7.13	Everglades Construction Co.
Dade	954	17.80	State Forces
		85.48	

Of the 54 miles from Lake Okeechobee to the State construction at the Dade County line, 48 miles were graded by the George D. Auchter Construction Company and the Badgett Construction Company. Auchter graded 33 of the 54 miles. Badgett's contract called for grading 15 miles from the 20 mile bend north of the Palm Beach County line.

Excavating Muck from Roadway.—On all sections it was necessary to excavate the muck from the roadway down to the limerock. The depth of this muck ranged from 9 feet on the north leg to 4 feet on the southern leg. As required by the contract, only power excavators equipped with clam-shell buckets were used to remove the muck. Auchter and Badgett used two drag lines in removing the muck, which was placed on the side opposite the canal (west side of road). Specifications called for a bottom width of thirty feet with a 1:1 slope.

No dressing of bottom or slope was required; however, the finish could not vary more than six inches from the cross-sections, and the muck had to be thoroughly removed to the bare rock. The unit cost of excavation varied with the depth of the muck, size of job, and other related factors. Auchter's contract



A Typical Cross Section for New Construction on Florida Route 26

You'll cut idle-equipment time

Did you ever figure how much time your equipment spends loafing because of delayed arrival of certain needed items of road steel? You can save a good part of this time by making sure shipments arrive complete.

An easy way to do this is to order all road steel from one source—Bethlehem. Because then Bethlehem Road Steel Service takes over the job of seeing to it that all your road steel items arrive together.

Other important advantages you get by ordering all road steel from Bethlehem: You save labor time. You cut down bookkeeping, accounting expense. You save correspondence, phoning time. And you get a line of road steel that's hard to beat anywhere for design and quality.

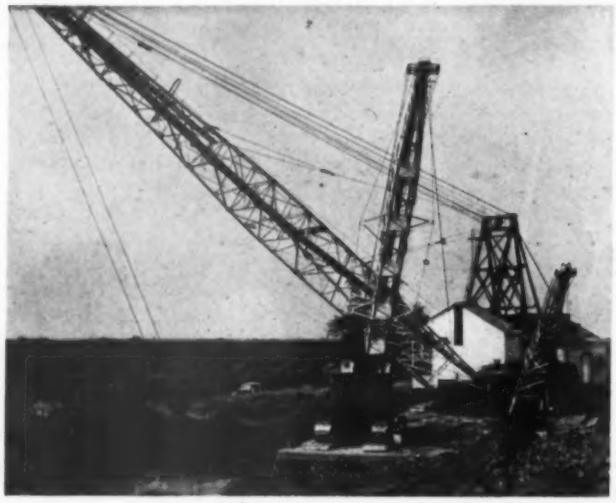
Why not combine all your road steel needs into one order to Bethlehem? See how you save with this better delivery from one of Bethlehem's 15 strategically located warehouses or local jobbers.

BETHLEHEM STEEL COMPANY

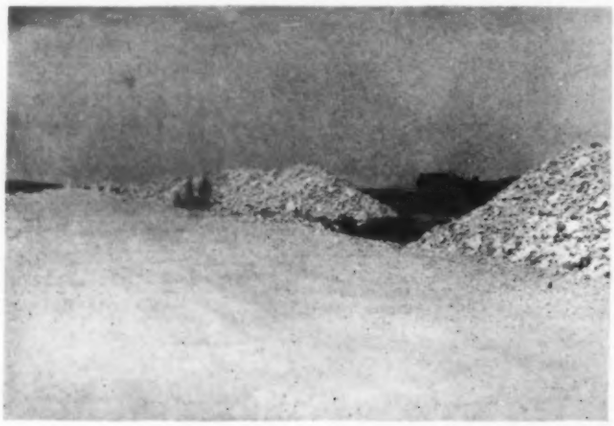
BETHLEHEM STEEL

in Palm Beach county was for 18c per cubic yard. Badgett's contract for the adjoining southern section was 17c per cubic yard, and Auchter's contract for the section from the 20 mile bend to the Dade County line was for only 9c per cubic yard. Contracts required that no muck be deposited within 150 feet of the center line of the canal channel.

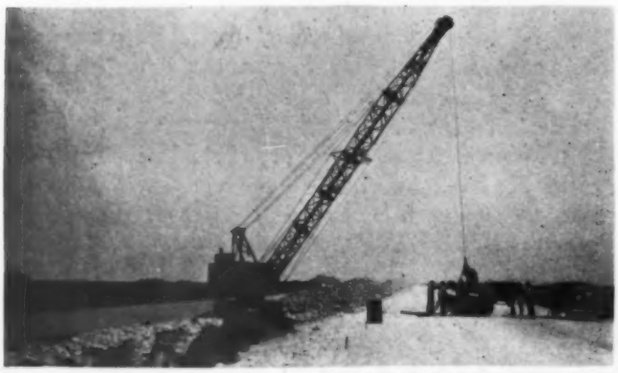
Filling Roadway Embankment.—As the muck was removed to the limerock, water drained into the roadbed. Construction of roadbed embankment involved filling the excavated strip with limerock taken from the adjacent canal or from existing spoil banks. The embankment was constructed to a height of five feet above the ground or water level, resulting in an average depth for the entire fill of eleven feet.



Equipment of Atlantic Dredging & Construction Co. Was Loaded on One Large Steel Barge to Move to Project. All Three Machines Are Removing Hyacinths From the North New River Canal at South Bay



Completed Grade on Project 168-C Showing Excess Rock Spoil Excavated to Maintain Minimum Canal Section



In April Project 186-C Looked Like This. The Machine Is Cleaning the Corners of a Typical Section in the Canal. Surplus Rock Is on the Berm. You Are Looking South

Specific gravity of all imported stone had to be at least 2.60. Specifications required that no rock that would not pass through a three-inch ring be used within one foot of the plane of the grade, that no rock that would not pass through a six-inch ring be used to two feet below the grade, and that no rock that would not pass through a 12-inch ring be used to a depth of four feet below the grade. Specifications further required that rock be spread on the embankment in eight-inch layers, except when the rock was filled into the water or when the rock was excavated from the water.

To obtain the rock for the fill, it was necessary to clear the spoil bank and/or dig from the bottom or side of the canal. On no section was the spoil bank material to fill the road embankment. Badgett's contract included the use of the spoil bank on the opposite side of the canal. He rigged up a belt conveyor mounted on a barge to move the rock across the canal. Before conveying, the rock was run through a screen and oversize boulders removed and placed in a spoil bank on the same side. Part of the canal excavation on this same contract was effected by draining sections of the canal and excavating the dry bottom. This was accomplished by damming a section, cutting a diversion canal, and then pumping the water out of the dammed section. This method of excavation was utilized for a while, but it soon proved more practical to excavate without unwatering the channel.

On the most northern project, the Atlantic Dredging and Construction Company used a 150-ton dragline mounted on a steel barge (as shown in photo) for rock excavation. Auchter, on his 20-mile grading contract in Palm Beach County utilized a Bucyrus Monighan walking dragline with a 100-foot boom which excavated the entire canal section and deposited the rock in the roadbed without double handling.

Extensive blasting was required to loosen the rock before the dragline could move it. One of the contractors fabricated a unique rig for the rock shooting by setting four jack hammers on a track which was suspended across the channel of the canal mounted on two barges. This arrangement allowed the hammers to be moved at will across the entire excavation section of the canal. Specifications required that the entangling hyacinths from the canal channel and the muck overburden from the banks be removed before blasting.

From the 20-mile bend into Miami no canal existed, and it was necessary to remove an adjacent strip of muck and excavate a borrow canal to secure limerock for the road embankment. On this section the muck was not as deep and the problem of excavation somewhat modified. Therefore, the unit cost of regular excavation was lower. Cost of regular rock excavation

EXCAVATION QUANTITIES BETWEEN SOUTH BAY AND DADE COUNTY LINE ON ROAD No. 26

Project		County	Miles	Reg. Exc. Cu. Yds.	Muck Exc. Cu. Yds.
F.A. 168-D	(3058)	Palm Beach	3.896	430,357	189,237
NRH 168-A	(4054)	Palm Beach	2.332	198,168	93,900
F.A. 168-B	(3020)	Palm Beach	10.038	740,362	485,533
F.A. 168-C	(3021)	Palm Beach	9.954	757,636	383,837
F.A. 241-A	(3027)	Broward	14.685	1,047,123	338,128
F.A. 241-B (1)	(3076)	Broward	12.952	1,066,733	218,373
Totals			53.857	4,240,379	1,709,008

TO GET DEFENSE JOBS DONE!

• *Even concrete roads have to get out of the way when a rush defense job takes over the ground. This "Caterpillar" Diesel D8 Tractor is ripping a LeTourneau rooter through six-inch solid concrete, preparing for construction of a Naval Air Base in Virginia.*

CATERPILLAR DIESEL

REG. U.S. PAT. OFF.

ENGINES AND ELECTRIC SETS
TRACK-TYPE TRACTORS
ROAD MACHINERY

Rolling the Local Rock Base on Project 168-B, J. D. Manly Co., Contractor

ranged from 36c per cubic yard on the most northern project to 25.8c per cubic yard on the most southern project.

Limitations on Excavating Canal.—Specifications placed certain limits on excavating rock from the bottom of the canal. The purpose was to insure adequate drainage and water flow, and to provide a navigable channel. Excavation included deepening the channel to a minimum of 12 feet below the water line. On Sections where sufficient rock was not obtained by widening to 55 feet, it was obtained from the channel bed. Specifications required that sections widened and deepened for extra rock be not less than 100 feet (long section). Where the spoil bank material between the road and canal was not reduced enough to provide adequate drainage for the roadway, lateral ditches were required to be cut through the spoil bank to the canal.

Labor and Equipment.—Labor and equipment utilized by the George D. Auchter Company of Jacksonville on the 20-mile project in Palm Beach County and by the Badget Construction Company of Fort Lauderdale, Florida (1937) on the 15-mile project in Broward County are as follows:

GEORGE D. AUCHTER CO.

Supervisor: F. J. Balthazar

Equipment	Labor	
3 draglines	6 foremen	6 powder men
1 drill barge	1 timekeeper	8 powder monkeys
4 jackhammers	10 dragline operators	1 tractor operator
1 grader	10 dragline oilers	3 spotters
	6 jackhammer operators	3 carpenters
	2 mechanics	1 rough blacksmith
	1 watchman	9 laborers

BADGETT CONSTRUCTION COMPANY

Supervisor: Marvin Leath

Equipment	Labor	
4 draglines	7 foremen	1 tractor operator
2 bulldozers	1 timekeeper	1 grader operator
1 tractor	1 clerk	1 watchman
1 grader	5 dragline operators	1 electrician
8 trucks	5 dragline oilers	4 drillmen
1 elect. conveyor	2 bulldozer operators	8 truck drivers
1 rock drill	1 mechanic	35 laborers

Surfacing

The limerock in the fill of this highway is similar to that used as a base for a large portion of the surfaced roads in Florida. This type base is easy to bond and has proved very satisfactory. Therefore, no separate base course was necessary. Surfacing involved scarifying, shaping, and compacting the limerock, and applying a bituminous treated wearing course. Practically all of the contracted surfacing was handled by the R. B. Tyler Company of Louisville, Kentucky, and the J. D. Manly Company of Leesburg, Florida.

Preparations for shaping and bonding the stone included removing and replacing unsuitable material. All stones that would not pass through a three-inch ring had to be removed from the surface and replaced with finer material. As it was necessary to sift the spoil bank for material to replace that removed, this problem was both difficult and annoying to the contractors.

The rock was scarified to a minimum depth of six inches and to the full width of the surface treatment. Then it was roughly watered and compacted. Compacting and rolling continued until the material was bonded into an unyielding mass. This rolling was effected with three wheel power type rollers (note photo) of not less than ten tons and with a rear wheel compression of 350 pounds per linear inch.

The bonded base was sealed with a tar prime coat,

Project 168-B Showing Completed Paving Put Down By J. D. Manly Co.

and a bituminous treated wearing course with type A crushed stone of not less than 85 pounds per cubic foot added. Two distributors were used in spreading for the bituminous treatment. The rock was spread on by a spreader box, and rolled with five-ton drums covered with solid rubber tires.

Equipment and Labor—Equipment and labor utilized by both Manly and Tyler in surfacing were as follows:

Equipment	Labor	
2 road patrols	1 timekeeper	2 tractor operators
3 rollers	3 foremen	10 truck drivers
1 shovel	2 grader operators	2 distributor operators
2 Letourneau scrapers	3 roller operators	1 spreader box operator
10 trucks	1 shovel operator	50 laborers
2 distributors	1 oiler	
1 spreader box		

Cost—The cost of constructing the embankment on this road was approximately $36,475 per mile, including engineering and miscellaneous charges. The average contract price for scarifying, shaping, and surface treating was $4,950 per mile, exclusive of miscellaneous and engineering expenses. Allowing ten percent for those items, the total cost for completed road was approximately $42,000 per mile. The total expenditures of the federal, state, and local governments on the entire route of State Road No. 26 approached $4,000,000. Grading, draining, and surfacing all section was stretched over a period of eight years.

HIGHWAY CONGRESS TO MEET IN MEXICO CITY

The Fourth Pan American Highway Congress will be held in Mexico City, September 15-24, 1941. While this is a governmental affair and delegates will be officially appointed by the United States, and the Central and South American countries, the American Road Builders' Association has been invited to participate by the Government of Mexico, representatives of this Association have the status of Associate Delegate.

Associate Delegates will pay a registration fee of 25 pesos, or approximately $5.50 in U. S. Currency, and will have the right to speak at the sessions but will not have a vote. Associate delegates will receive free of charge all publications of the Congress and may take part in the official functions, excursions, entertainment.

The Organizing Committee for the Congress has arranged a most interesting program. In addition to the Congress there will be an exposition of road building machinery and equipment. Many American firms will participate in this exposition.

OFFICIAL PROGRAM

THURSDAY 11TH, FRIDAY 12TH, AND SATURDAY 13TH OF SEPTEMBER, AT THE PALACIO DE BELLAS ARTES (FINE ARTS PALACE)

Registration of Delegates and Associate Members.
Distribution of programs, badges, invitations, copies of papers, etc.

SUNDAY, SEPTEMBER 14TH

Free day.

MONDAY, SEPTEMBER 15TH

AT THE PALACIO DE BELLAS ARTS (FINE ARTS PALACE)

9 to 11 hours—Registration and delivery of credentials continued.

11 to 12 hours—Preliminary meeting of the Official Delegations:
Presidents to name speakers for the evening session.

RAILWAY INSPECTION CARS
GARDEN TRACTORS
LIGHTING PLANTS
THESE ARE A FEW OF THE WIDE RANGE OF APPLICATIONS OF BRIGGS & STRATTON MOTORS
Presidents
of thousands of companies, manufacturing and distributing gasoline-powered appliances and equipment, know that Briggs & Stratton motors build and maintain "CUSTOMER GOOD WILL."
These men approve Briggs & Stratton motors, knowing that they make good equipment better. They know, too, that Briggs & Stratton air-cooled gasoline motors assure dependable and economical performance—proved on more than a million pieces of powered equipment.
BRIGGS & STRATTON CORP. • Milwaukee, Wis., U.S.A.
4 CYCLE
BRIGGS & STRATTON
GASOLINE MOTORS

POWERS' CATALOG • COLUMN •

CHANGES in equipment specifications between July 1 and Aug. 1 are shown below.

Specification Changes

Caterpillar Tractor Co.

TRACTOR D4

	Previous	Present Revised
Shipping Weight		
Narrow Model	9,810 lb.	9,910 lb.
Wide Model	10,050 lb.	10,240 lb.
Operating Weight		
Narrow Model	10,000 lb.	10,100 lb.
Wide Model	10,210 lb.	10,400 lb.

Porcupine Company

	Previous	Present Revised
SINGLE BLADE SNOW PLOW No. H120F		
Moldboard Height	2'0"	2'6"
Oscillating Shoes	6" C-W	8" C-W
SINGLE BLADE SNOW PLOW No. H132F		
Designed for Truck	2-5 ton	3-5 ton
Moldboard Height	2'0"	2'6"
Oscillating Shoes	6" C-W	8" C-W

Information not published in Power's Catalog for 1941, but now available for all Porcupine snow plows, is as follows.

Model	Weight of Plow Only (Approx.)	Dimensions of Cutting Edge (W'd x L x Th'k)
C78F	330 lb.	3"x 78"x5/16"
L78F	330 lb.	3"x 78"x5/16"
C96F	390 lb.	6"x 96"x3/8"
L96F	390 lb.	6"x 96"x3/8"
L108F	430 lb.	6"x108"x3/8"
L120F	480 lb.	6"x120"x3/8"
H120F	700 lb.	6"x120"x1/2"
H132F	775 lb.	6"x132"x1/2"

Koehring Company

CONCRETE PAVING MIXER—34E Twinbatch

	Previous	Present Revised
Traction Tread Shoes	17"	18½"

(There has been no change in shoe size since publication of Powers' Catalog in April. The change from 18½" to 17" reported in this column in June was in error.)

ROME GRADER

Motor Graders Nos. 101, 201, 202, 301 and 302 all discontinued.

Motor Graders Nos. 103 and 104—new models.

Complete specifications may be had from the company.

Following are important items:

Drive	No. 103 Gas Single	No. 104 Gas Single	No. 104 Diesel Single
Weight (with leaning front wheels)	8,900 lb.	9,500 lb.	9,800 lb.
Weight (with straight front wheels)	8,750 lb.	9,350 lb.	9,650 lb.
Length overall	20'5"	20'5"	20'5"
Width overall	69½"	70"	70"
Speeds	(Variable by governor control)		
First M.P.H.	1.4-1.9	1.9	1.9
Fifth M.P.H.	8.6-12.9	12.6	12.6
Reverse M.P.H.	1.6-2.2	2.2	2.2
Blade Dimension	8'x18"x½"	8'x18"x½"	8'x18"x½"
Special Blade	10'x18"x⅜" or ½"	10'x18"x⅜" or ½"	10'x18"x⅜" or ½"
Tires—Front	6.00-20	6.00-20	6.00-20
Tires—Rear	9.00-24	9.00-24	9.00-24
Engine — International	31 H.P.	41 H.P.	39 H.P.

Noon— Formal opening joint session of the IV Pan-American Highway and the II Inter-American Turism Congresses at the Bellas Artes Theatre.
Official welcome speech by Mexico's Secretary of the Interior.

16 hours—Independent plenary sessions of each Congress to elect Officers and Committees. (Each Congress shall convene at its own conference room of the Bellas Artes Palace).

TUESDAY, SEPTEMBER 16TH (INDEPENDENCE DAY) AT THE CITY HALL

10 hours—Reception by the City Council, of the Delegates to both Congresses.

WEDNESDAY, SEPTEMBER 17TH, AT NATIONAL STADIUM

10 hours—Parade of the Flags of all the American countries—Americas' Hymn—Message to all the American countries by the President of the Republic. This festival will be attended by the President's Cabinet, the Hon. Diplomatic Corps and the Delegates and Associate Members of both Congresses.
Immediately thereafter, the Road Machinery Exposition will be opened.

THURSDAY, SEPTEMBER 18TH, AT BELLAS ARTES PALACE

10 hours—Meetings of both Congresses' Committees.
18 hours—Meetings of both Congresses' Committees.

FRIDAY, SEPTEMBER 19TH

10 hours—Independent plenary sessions for the approval of the final minute of the two Congresses, at the Bellas Artes Palace.

SATURDAY, SEPTEMBER 20TH

10 hours—Visit to highways in the Federal District.
14 hours—Banquet at Xochimilco in honor of the Delegates to both Congresses, presided by the Secretary of Communications and Public Works and the Mayor of México City.

SUNDAY, SEPTEMBER 21ST, AT NATIONAL STADIUM

11 hours—Festival: "The Sun's Messenger" Historical play on the Great Tenochtilán (old Mexican Capital). Author and Director, Prof. Efrén Orozco Rosales. This festival was organized in the Departments of Interior and Public Education in honor of the Delegates and Associate Members of the two Congresses.

MONDAY, SEPTEMBER 22ND, AT BELLAS ARTES PALACE

10 hours—Meetings of both Congresses' Committees.
16 hours—Meetings of the two Congresses' Committees.
20 hours—Highway films will be shown at the IV Pan-American Highway Congress Conference room.

TUESDAY, SEPTEMBER 23RD

10 hours—Meetings of both Committees.
16 hours—Independent plenary sessions of both Congresses.

WEDNESDAY, SEPTEMBER 24TH

10 hours—Independent plenary sessions for the approval of the final minute of the two Congresses.

Noon— Distribution of diplomas to the Machinery Exhibitors at the National Stadium.

17 hours—Formal closing joint session of the IV Pan-American Highway and the II Inter-American Turism Congresses, at the Bellas Artes Theatre. Farewell speech by the Secretary of Communications and Public Works.

22 hours—Official reception in honor of the Delegates and Associate Members of the two Congresses, at the Foreign Relations Department.

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MOTOR VEHICLE REGISTRATION

The third largest annual increase in registrations of motor vehicles since the depression occurred in 1940, according to the Public Roads Administration of the Federal Works Agency. Motor-vehicle registration last year surpassed the 1939 figure by 1,442,991. This compares with an increase of 1,950,027 in 1936 and 1,576,474 in 1937. The all-time record increase was 2,850,000 in 1923.

In the past 42 years in which motor vehicles have been registered, the only decreases were recorded in 1938 and in each of the three years, 1931-33.

Last year 32,452,861 motor vehicles were registered according to reports of State authorities to the Public Roads Administration. Registration fees amounted to $373,771,000. Miscellaneous receipts, such as fees for permits and certificates of title, fines, and penalties,

TABLE 1.—MOTOR VEHICLE REGISTRATIONS, 1940

	Vehicles registered: public, private and commercial	Increase in registration (percent)	Registration receipts and miscellaneous fees
Alabama	347,123	4.6	$4,548,000
Arizona	143,451	5.4	1,225,000
Arkansas	261,997	6.6	3,399,000
California	2,810,566	6.4	27,914,000
Colorado	355,309	2.7	2,797,000
Connecticut	498,463	7.1	7,385,000
Delaware	72,973	5.6	1,252,000
Florida	503,678	9.8	8,002,000
Georgia	513,097	7.4	2,768,000
Idaho	167,066	6.5	1,401,000
Illinois	1,941,206	4.2	24,760,000
Indiana	1,003,240	3.5	10,596,000
Iowa	802,885	3.7	12,987,000
Kansas	584,380	1.5	4,012,000
Kentucky	470,825	6.0	5,509,000
Louisiana	372,830	7.5	5,392,000
Maine	208,595	2.4	4,162,000
Maryland	450,169	4.7	6,698,000
Massachusetts	907,862	3.8	7,319,000
Michigan	1,556,571	5.5	24,115,000
Minnesota	879,862	3.7	10,305,000
Mississippi	264,439	6.3	3,009,000
Missouri	926,715	5.1	10,750,000
Montana	196,116	5.8	1,721,000
Nebraska	417,827	1.5	2,839,000
Nevada	45,708	8.1	313,000
New Hampshire	136,109	3.1	3,052,000
New Jersey	1,101,213	5.7	22,562,000
New Mexico	128,159	3.7	1,994,000
New York	2,778,312	3.3	55,944,000
North Carolina	610,121	3.8	8,174,000
North Dakota	184,016	3.3	1,661,000
Ohio	1,942,639	1.7	30,376,000
Oklahoma	585,052	3.4	6,435,000
Oregon	401,328	6.5	3,346,000
Pennsylvania	2,169,702	4.2	38,891,000
Rhode Island	189,717	7.1	3,218,000
South Carolina	343,688	7.0	2,104,000
South Dakota	198,615	3.4	1,794,000
Tennessee	459,170	5.8	5,330,000
Texas	1,719,313	4.7	22,422,000
Utah	143,634	5.7	1,227,000
Vermont	94,472	3.4	2,625,000
Virginia	509,191	8.4	7,159,000
Washington	576,248	5.5	3,728,000
West Virginia	309,361	5.8	6,529,000
Wisconsin	913,055	6.3	13,075,000
Wyoming	88,166	3.7	603,000
Dist. of Columbia	165,220	1.3[1]	1,751,000
At Large	3 407	51.4	
Total or Average	32,452,861	4.7	$439,178,000

[1] Decrease

brought total receipts in 1940 to $439,178,000, or $26,684,000 more than in 1939.

Forty-four states and the District of Columbia took in $29,898,000 in fees for driver permits.

Traffic fines and penalties are not listed among motor vehicle receipts in all States, but in 31 states these totaled $2,959,000.

The 1940 registrations included 32,025,365 private and commercial vehicles; 143,175 vehicles owned by the Federal Government; and 284,321 owned by state, county, and municipal governments.

Among the 1940 registrations were 4,590,386 private and commercial trucks; 62,582 private and commercial busses; 1,314,547 trailers; and 136,402 motorcycles. The figure for busses is less than the actual number, as several States include them with trucks of passenger cars. Many States do not register passenger car trailers.

The 1940 consumption of gasoline taxed at full state rates represents a 6.2 percent increase over 1939. The seven states with a total consumption of more than a billion gallons each are New York, 1.8 billion; California, 1.8 billion; Pennsylvania, 1.6; Illinois, 1.4; Ohio, 1.3; Texas, 1.2; and Michigan, 1.1.

State gas taxes, ranging from 2 to 7 ct. and averaging 3.96 ct. per gallon, were levied on 1,283,000,000 gal. more than in 1939, according to state agencies. These tax levies, plus receipts such as inspection fees, dealers license fees, fines and penalties, totaled $870,692,000 for 1940, compared with $822,013,000 for 1939. Taxes of $556,000 for aviation gasoline are included in the 1940 total, but refunds for nonhighway use, amounting to $50,017,000 are excluded.

The greatest increases in gasoline consumption, based on tax collections, were reported by the District of Columbia, with 12.7 percent more gallons in 1940 than in 1939; Tennessee, 12.5 percent; Florida, 11; South Carolina, 10.8; and Massachusetts, 10.4. No state reported a decrease.

Table 1 gives the vehicle registration and receipts by States and the percentage increase in total registrations compared with the previous year.

Fred Burggraf Made Assistant Director

The Executive Committee of the Highway Research Board has announced the appointment of Fred Burggraf to the position of Assistant Director. Mr. Burggraf has been connected with research relating to highways since 1919. His career has included engagements with: the National Bureau of Standards, the Illinois Division of Highways, the Highway Research Board and the Calcium Chloride Association.

▼

British Use Map-Printing Trucks.—New types of map-printing trucks for work in the field are being employed by the British army. Each unit consists of three trucks with one carrying a high-grade lithograph printing machine, another carrying machinery for auxiliary processes and a third truck that generates electric light and power.

▼

LEW WALLACE BROOKS

Lew Wallace Brooks, president of Brooks Equipment & Mfg. Company, Knoxville, Tennessee, passed away Monday, July 21, 1941. The death of Mr. Brooks is a great loss not only to his family and intimate business associates, but also to his many acquaintances throughout the industry his company serves.

Chin Cupping

Chin cupping (so we hear) is on the increase. Chin cupping is perhaps one of the greatest mechanical aids to concentration such as thinking in a complete circle. During the depression it denoted losses and deep thought on how to get a share of no business. Today it is indulged in as a process for solving the problem of how to get the most production in the shortest time at the least cost so there'll still be time during this good business to worry how to get more business that needs the most production in the shortest time, etc. For construction men, instead of chin cupping, we recommend this:

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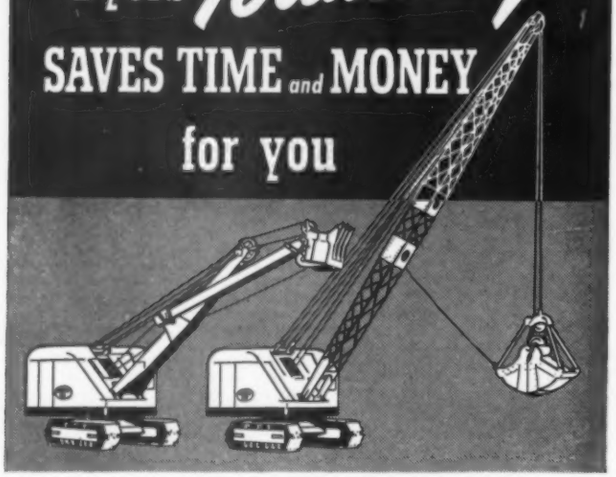

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New Gasoline Tax Legislation In Florida

By THOMAS A. JOHNSON
Chairman,
State Road Department of Florida

NEW gas tax legislation passed by the 1941 Legislature is really a streamlined development of legislation first enacted in 1931. Prior to that date, counties and districts had bonded for county road purposes and built disconnected but necessary roads in their local field and were collecting *ad valorem* taxes for the purpose of retirement of bonds.

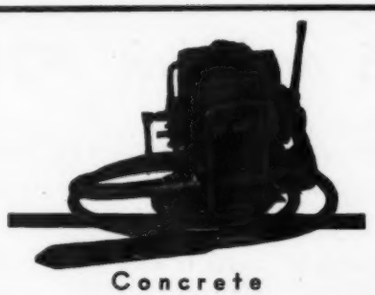
The 1931 new designated and fixed credits for roads previously built by the counties, based on actual expenditures made by them to an amount of $107,688,-461.89. Since that date, the counties received income from the so-called Second Gas Tax payments. This has reduced their outstanding credit [bonds owing—Ed.] to $36,000,000 still due. Under this plan, 20 of the 67 counties have been fully repaid. [That is, the state paid the counties for funds they spent. See editorial in ROADS AND STREETS for April, 1941.—Ed.]

However, since that date, new roads have been built at the expense of the counties. Under Senate Bill 321, they will permit an additional $94,000,000 of credits to be allocated to the counties in the same manner as the 1931 law. Senate Bill 322 authorizes additional credit to the several counties for interest paid on monies used for this previous construction which is estimated to produce for the various counties $247,401,163 credit. The third bill passed, to wit: Senate Bill 325, is, in fact, an amendment to the 1931 act to permit the continuation of the distribution of the gas tax until 1943 upon which date it is assumed that an amendment to the Constitution of Florida will be effective permitting the fixing of the gasoline tax allocation for a period ending in 1992, and under which Constitutional Amendment, the payment of the county credits would be limited to two cents per gallon on all gasoline sold.

Further provision in the legislation permits annual determination of a surplus in the funds of a respective county when sufficient money has been provided under the credit plan for the payment of interest, principal and sinking funds on the outstanding bonds of the county, and from such surplus, the county will receive 20 per cent for the construction and maintenance of roads in the county and the State Road Department will receive 80 per cent for the construction of state roads in such county, or the lease or purchase of bridges on state roads in said county.

Additional powers were given to the State Board of Administration permitting the said Board to refund the bonds of a particular county or district for the purpose of reducing the annual curtailments with the aim to eliminate the levying and collecting of *ad valorem* taxes by any county or district for the purpose of meeting its bond obligations.

These various laws represent the most complete answer to the problem of road building and financing yet evolved in Florida, and was suggested by the present Governor, Spessard L. Holland, after considerable experience as Senator in the Legislature. Such objections as were raised by affected counties were adjusted by compromise and the present laws represent a completely harmonious solution to a vexing problem, and should be a model for other states with similar difficulties, to investigate and adopt.



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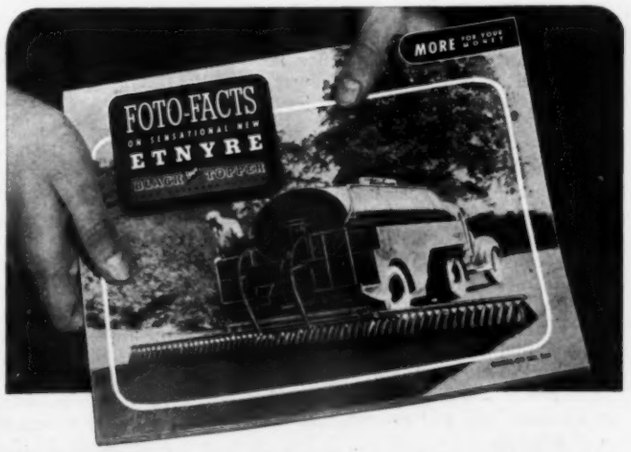

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ABOUT CONTRACTORS *and their* JOBS

The following information is published as reports from field contact men after the style of the former Earth Mover and Road Builder magazine. The editors of ROADS AND STREETS do not verify or check any of the information. It is given here as the reports of men who are constantly contacting contractors in their respective areas.

MONTANA AREA

Reported by
L. E. JONES

New Work. — The Montana State Highway Commission has announced that contracts will be let on ten road and bridge projects on August 20, 1941. The estimated cost of these projects are $650,000.

* * * * *

Money for Montana Airports.—Of the recent list of construction and improvement projects, announced by the Administrator of C.A.A. the following Montana airports will receive allocated amounts: Billings, $137,000; Bozeman, $193,000; Great Falls, $36,000; Helena, $144,800; Lewistown, $166,000, and Miles City, $123,000. In addition to constructing or extending runway strips, these improvements were approved: Butte, non-labor allocations to extend basic lighting and complete present project; Missoula, $70,000, non-labor allocation to complete present project.

* * * * *

"Hungry Horse" Dam. — Senator James E. Murray recently said he believed work could be started this coming winter on a land clearing project in connection with the proposed 31 million dollar "Hungry Horse" Dam on the South Fork of the Flathead River, about 27 miles north of Kalisspell, Montana. The Hungry Horse Dam as proposed is for the development of additional power.

* * * * *

Great Falls Firm Gets Contract.—Announcement from Washington advises that the well known firm of architects, Shanley, Van Teylingen and Hennison of Great Falls, Montana, were awarded the contract for architect and engineering services in connection with the construction of a Triangular Division Camp for winter training of men with the U. S. Army. Its location is West Yellowstone, Wyo. The camp will be designed to handle 30,000 men and if and when built will cost around $22,800,000 for construction.

MICHIGAN AREA

Reported by
J. M. TELFORD

Contracts Awarded at Fort Custer.—Several additional contracts for construction work of various types in and near Fort Custer have been awarded recently. Included are a $138,260 addition to the $202,092 project for road improvements at the Fort, now under construction by Louis Garavaglia of Detroit; a $64,000 contract for an athletic fieldhouse, to the Miller-Davis Company of Kalamazoo; a $69,000 contract for additional concrete paving, to the Bridgeport Core Sand Company. L. W. Edison has been awarded a surfacing contract at the Kellogg airport, adjoining the Fort.

William J. Slavin.—One of Michigan's best-liked county road engineers, William J. Slavin, died suddenly at his home in Howell July 8. Mr. Slavin was Livingston county's first highway engineer, a position he had held continuously from 1919 until his death. Other recent deaths of members of the construction industry include those of Amos Dyer of McBride, road contractor and gravel producer, and Mark E. Hamer, of the Detroit contracting firm of Hamer Bros.

* * * * *

Commissioner Kennely Inaugurated.—Michigan's strategic military highway network and its most heavily used civilian highways are largely the same, so that the proposed defense road appropriation from the Federal government will help to fulfill our obligations for the improvement of civilian traffic facilities," G. Donald Kennedy declared in an address at his inaugural for his first full term as State Highway Commissioner. Referring to future highway construction, he said: "The state will not build gravel roads hereafter, and no more undivided three and four-lane arteries will be constructed. The two-lane hard surface roadway will be the basic roadway type. The day of the multiple land undivided roadway is gone. Where traffic is heavy, divided roadways will be built. By 1960 we will have about 1,700 miles of divided highway in Michigan."

* * * * *

A Good Suggestion.—Members of the Northern Michigan County Road Commissioners Association decided to recommend use of county road trucks to assist in collection of aluminum during the national campaign to collect the metal.

* * * * *

Michigan County News.—Robert Hudson of Owosso was the successful bidder on a $21,589.70 project to construct eight-tenths of a mile of concrete pavement just west of Lansing, for the Ingham County Road Commission.

George Koronski, engineer for the Gogebic County Road Commission, was elected president of the Upper Peninsula Road Builders Association. W. C. Veale, Keweenaw county, was chosen vice-president, and T. S. Dundon, Luce county, secretary-treasurer.

* * * * *

Recent Awards.—Recent contract awards by the State Highway Department include the following:

6.537 miles of grading and stabilized aggregate in Charlevoix county to Marsman & Taber of Grand Rapids, at $44,420.10.

6.229 miles of grading and sand bituminous and sand cement surfacing in Crawford county, to A. W. Hodgkiss of Petoskey at $87,077.77.

3.02 miles of grading and soil cement stabilization in Ingham county, to Ray Sablain of Lansing at $57,340.97.

3.01 miles of grading and aggregate surfacing in Kent county to Paul Miller of Sparta at $63,758.63.

2,549 miles of grading and concrete pavement in Mackinac county, to C. G. Bridges of Escanaba at $108,600.94.

1.926 miles of grading and aggregate surfacing in Van Buren county to Wilmer Pierson of Saginaw at $53,228.13.

0.909 mile of grading and aggregate surfacing in Van Buren county to Edward Closser of Detroit at $69,728.55.

0.758 miles of grading and oil aggregate surfacing in Osceola county to Edward Closser of Detroit at $32,027.25.

KANSAS CITY AREA

Reported by
PAUL L. MATCHETTE

Ordnance Plant Ahead of Schedule.—The Lake City Ordnance Plant being constructed by the Government for the Remington Arms Company, is now ahead of schedule. The Ordnance Plant covers an area of 3200 acres, located a short distance east of Independence, Missouri, or about 20 miles east of Downtown Kansas City.

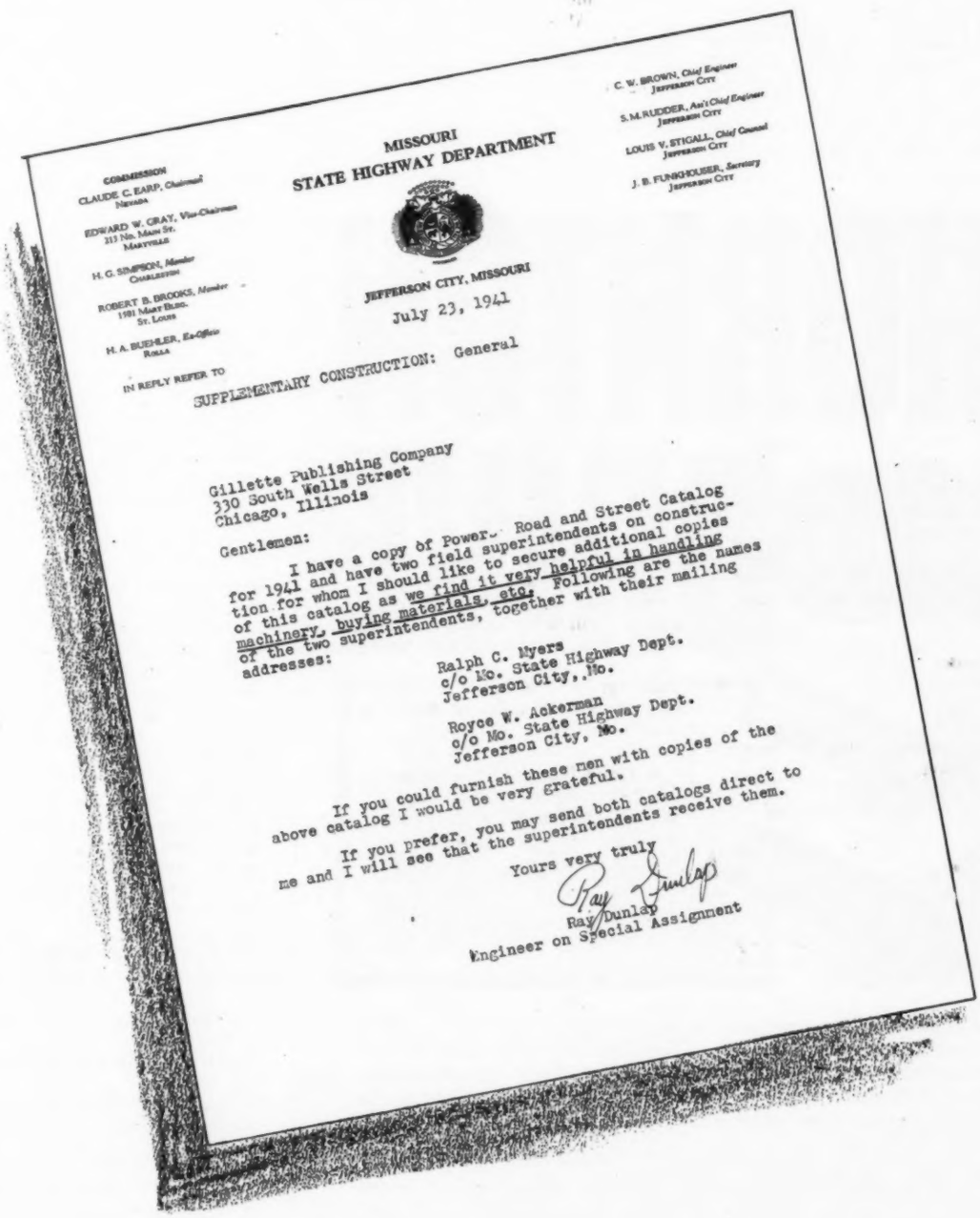
Foley Brothers, of Minneapolis, and Walbridge, Aldinger Company, of Detroit, are the contractors. Smith, Hinchman, and Grylls, of Detroit, are the engineers. Captain Lynn C. Barnes is Constructing Quartermaster. S. J. Callahan, chief civil engineer, is in charge of roads and streets. T. H. Ames, of Foley Brothers, is the general superintendent. All of these men are experienced in construction work and are doing an especially fine job at Lake City. Between 6,000 and 7,000 men working on three shifts, are building the plant. It has a priority rating of A-1A.

* * * * *

American Excavators, Inc., Are Low Bidders. — Fort Leonard Wood, Missouri, is located approximately 50 miles south of Jefferson City, and 85 miles east of Springfield, Missouri, near the middle of the Ozarks. Reports show there are now between 30,000 and 40,000 soldiers in training at the Fort. Bids were recently taken for the paving of 53 miles of roads and streets within the camp.

American Excavators, Inc., of Kansas City, were the low bidders on the concrete and asphaltic concrete jobs. O'Dell and Riney, of Hannibal, Missouri, were the low bidders on the bituminous mat job. Part of the contract was awarded to American Excavators, Inc., which is owned by William P. Tobin. The balance is being held up, awaiting appropriations of additional funds. Major Frank Reed, Jr., is constructing quartermaster. Major Hobart M. Brock, formerly of the Lake City Ordnance Plant, Independence, Missouri, has charge of lump sum contracts. Jack Edwards is his civilian assistant. Major Reed, Major Brock, and Jack Edwards make an exceptionally fine combination on construc-

"We find it very helpful"



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July 23, 1941

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Gentlemen:

I have a copy of Power... Road and Street Catalog for 1941 and have two field superintendents on construction for whom I should like to secure additional copies of this catalog as we find it very helpful in handling machinery, buying materials, etc. Following are the names of the two superintendents, together with their mailing addresses:

Ralph C. Myers
c/o Mo. State Highway Dept.
Jefferson City, Mo.

Royce W. Ackerman
c/o Mo. State Highway Dept.
Jefferson City, Mo.

If you could furnish these men with copies of the above catalog I would be very grateful.

If you prefer, you may send both catalogs direct to me and I will see that the superintendents receive them.

Yours very truly

Ray Dunlap

Ray Dunlap
Engineer on Special Assignment

POWERS' ROAD and STREET CATALOG

330 So. Wells Street **Chicago, Illinois**

tion. They are doing an exceptional job and are to be congratulated on the efficient manner in which the work is being done. Mr. Chet Roweth, vice-president and general superintendent of American Excavators, Inc., is in charge for the contractors. Gil Stoelting, of the E. W. Davis Construction Company, is pouring the slab. Both Chet Roweth and Gil Stoelting are old timers. The betting is that these boys will finish far ahead of schedule.

* * * * *

Garrett Construction Company Makes Exceptional Progress.—Many of the friends of Fred W. Garrett and W. N. Thornton, president and secretary of the Garrett Construction Company, Springfield, Missouri, will be glad to know that they are away out in front on their schedule in building the roads and streets around the new O'Reilley Military Hospital, northeast of Springfield, Missouri. The building of this hospital is under a general contract by the Swenson Construction Company, Kansas City, Missouri. Joseph O'Neil, of Leavenworth, Kansas, is putting in the sewer and water lines. The Garrett Construction Company, until recently, operated two complete concrete paving outfits, a complete grading outfit, and a complete blacktop outfit. Also they built bridges and did a considerable amount of engineering work in the construction of sewer and water works projects. During this past year they have curtailed their out-state operations. At the present time they are operating their rock quarry in the City of Springfield, which has a capacity of up to 1,000 tons per day, and the operation of their ready-mixed concrete truck-mixer plant, which furnishes the territory in and around Springfield with ready-mixed concrete. John F. Hendrickson, formerly city engineer of Springfield, is in charge of the ready-mixed plant.

* * * * *

Work on Fairfax Airport in Full Swing.—J. A. Tobin Construction Company, of Kansas City, Kansas, is building the new concrete runways for the Fairfax Airport on the Missouri river in North Kansas City, Kansas. The contract for these runways amounted to approximately one and three-quarter million dollars, and calls for approximately 400,000 square yards of concrete pavement. George Bennett Construction Company, of Kansas City, Kansas, is doing the grading and dirt work.

The Fairfax Airport is a military airport, and is directly across the Missouri river west from the Kansas City Municipal Airport. Directly west of the Fairfax airport is the new Fairfax Bomber Plant, which is now being built by the S. Patti Construction Company, of Kansas City.

Joe Tobin, owner of the J. A. Tobin Construction Company, is perhaps one of the largest operators in the construction field in the state of Kansas. Besides doing concrete paving work, Joe operates an asphalt plant, two rock quarries, goes in for bridge building on a large scale. and is one of the most influential men in Kansas City, Kansas. Both Joe Tobin, and Bill Tobin, brothers, started in as foremen in the construction industry in Kansas City, Missouri, and worked their way up until both of these men are the heads of two of the largest construction organizations in the southwest. Joe Tobin confines most of his work to Kansas and Missouri, while Bill Tobin operates over the United States from the east coast to the west coast, and at the present time has a large job underway in Alaska.

* * * * *

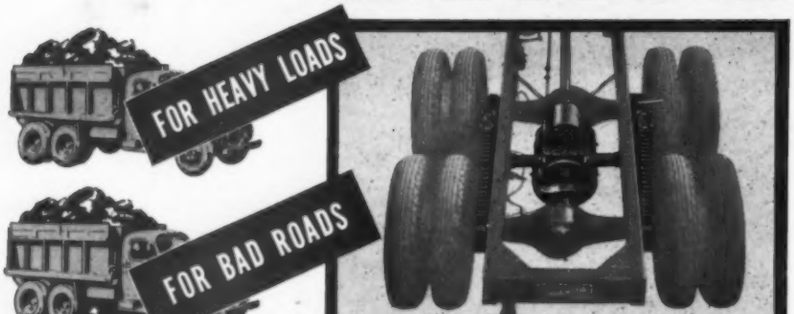
Kansas Road Contractors Meet.—On July 11, the Kansas Road Contractors held their summer meeting and picnic at Red Burt's farm, northwest of Hutchinson, Kansas. Over 150 contractors, highway engineers, material men and machinery men attended. C. L. "Red" Burt is credited with being the best known contractor in the southwest. Red does sewer and street paving. His home office is Hutchinson, Kansas, and to show you how well the people of Hutchinson think of him, they elected him Mayor. He did himself proud, and a real job.

Charles E. Clark is president of the Kansas Contractors Association, a division of A. G. C. Both Charlie Clark and Bill Ballard, secretary, are to be congratulated on the fine job done in putting over this picnic and summer meeting. Gene Irwin, of List and Clark Construction Company, did himself proud in pitching his team, the Contractors, to victory over the Engineers in the sensational baseball game. The next day he was "all in," but then, that is another story.

It is tradition that anyone who attends the picnic at Red Burt's farm does so without his necktie. "TARZ" Marsh, engineer of Maintenance, Kansas State Highway Department, with the help of several co-conspirators, painted a necktie on the front of

THORNTON

4-REAR-WHEEL DRIVE



In these days when *transportation* must sustain the heavy demands of defense and industrial programs, THORNTON Four-Rear-Wheel DRIVE is rendering a tremendous service in scores of industries. With its application to trucks up to 3-ton rating, it supplies double the tractive effort and more than twice the payload capacity.

This unit is giving vital aid in solving defense transportation problems.

Engineered particularly to meet YOUR requirements, your THORNTON-equipped trucks will carry their bigger loads faster, more economically and, if necessary, through tougher going. "Walking-Beam" dual suspension reduces shock on load and road.

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THORNTON TANDEM CO.
8721-8779 GRINNELL AVE. DETROIT, MICH.
Manufacturers also of the THORNTON automatic-locking DIFFERENTIAL
"When you need TRACTION you need THORNTON"

his shirt. Tarz is an ex-football champion, so is Red Burt. With a pair of tin shears, Red proceeded to cut out the necktie. That was one of the outstanding features of the day.

Dwight Hardman, road building contractor from Alton, Kansas, flew over in his airplane. At about the same time, Claire Miller, managing partner of the San Ore Construction Company, at McPherson, Kansas, was given his final test flight at the Hutchinson Airport, and was awarded a pilot's license. The picnic was a huge success. We are all looking forward to the next one.

* * * * *

Make Rapid Progress On Tulsa Job.—Long-Manhattan Company, a combination of Long Construction Company, Kansas City, and Manhattan Construction Company, Muskogee, Oklahoma, are making fast progress on the new Tulsa Bomber Plant. This plant, when finished this fall, will turn out between one and two hundred bombers per month. Stanley Evans, of Fort Smith, Arkansas, is moving the dirt.

Long-Manhattan are part of the organization. Long-Manhattan-Watson, who built Camp Funston at Fort Riley this spring. Finishing the Fort Riley job they moved to Tulsa on the Bomber Plant, and are making exceedingly fast progress. Carl Martin, formerly with Paulette and Wilson, consulting engineers, Topeka and Salina, is in charge of the engineering for the contractors. Austin Company, of Cleveland, are the engineers for the project.

* * * * *

Contractors Combine to Build Parts Depot.—Dunning, James, and Patterson, consisting of Dunning Construction Company, and Guy H. James, both of Oklahoma City, and Patterson Steel Company, of Tulsa, have negotiated a contract with the U. S. Engineers to build the new $19,000,000 airplane parts depot and airport, being located near Oklahoma City. Guy James will handle the utilities, such as street and road paving, sewer, gas, and water mains, drainage, and airport runways, according to the latest reports. It is said that army airplanes throughout the central west and southwest will be serviced at this depot. The U. S. Engineers could not have obtained three better concerns to do this job, and are to be congratulated on picking these up-to-the-minute contractors to do the work.

ST. LOUIS AREA

Reported By
O. B. AVERY

Miscellaneous Awards. — Hoeffken Bros., Belleville, Illinois, were awarded contract by the Illinois State Highway Dept. for 2.22 miles of 22 ft. concrete spur to Scott Field, Route 161, about 5 miles east of Belleville, at $125,936.00. Bids were opened June 13th.

A. P. Munsen, Marion, Iowa, was also awarded contract at the same letting for reinforcement concrete substructure and erection of two 1-beam superstructs on Route 155, Greene County, at $48.523.00.

Contract was awarded to Hoeffken Bros. Construction Company and G. E. Tillman, Centralia, Illinois, for the construction of Paducah Flood Protection Works, Section "B," Unit 11, by the U. S. Engineers at Louisville, Ky., at $896,708.00.

* * * * *

Some Illinois Contracts.—Low bidders at the July 15th letting of the Illinois State Highway Dept. included the following:

Edwardsville Construction Co., Edwardsville, Illinois, 3.16 miles of 22 ft. and 20 ft. relocation of Route 11, Bond County, near Mulberry Grove—$201,234.00.

Blackwell Corporation, East St. Louis, 1.94 miles of 22 ft. relocation of Route 12 near Smithboro in Bond County—$87,-991.00.

Tritt Bros., Belleville, Illinois, 0.78 miles of 22 ft. and 20 ft. approaches to Pa. R.R. overhead on relocation of Route 11, east of Stubblefield in Bond County—$113,156.

Sangamo Construction Company, Springfield, Illinois, 1.11 miles of 20 ft. and 22 ft. approaches to Ill. Terminal tracks in Carlinville, Macoupin County—$247,462.00.

Parham Construction Co., E. St. Louis, Illinois, construction work of Penn. R.R. overhead on relocation of Route 11 east of Stubblefield, Bond County—$69,439.00.

H. J. Eppel, Pontiac, Illinois, 1.94 cu. yd. concrete, 143,950 cu. yds. grading in Greene County—$36,822.00.

Lake Bros. Construction Co., Effingham, Illinois, 3.39 miles of concrete and grading in Perry County—$37,567.00.

Contract was awarded to Fleming & Kilgo, Alton, Illinois, for the construction of a sewage disposal plant at East St. Louis, for the State of Illinois, at $12,170.00.

Lake States Engineering Company, Chi-

SNOW PLOWS FOR ANY MOTOR TRUCK . . . IN "V", REVERSIBLE AND ONE WAY TRIPPING BLADE TYPES . . . SNOW PLOWS FOR LIGHT AND HEAVY TRACTORS . . . FOR HIGHWAY, STREET OR SIDEWALK SNOW REMOVAL.

Today, when speed is vital, there is more urgent need than ever before to make early and adequate provision for snow removal. Have you a sufficient force of good reliable snow plows ready to fight when the heavy snows come?

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Only Bakers give you such features as sectional tripping blades, scientific moldboard curvature and compact, efficient hydraulic control. Satisfied owners are Bakers biggest boosters. Find out why.

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BAKER SNOW PLOWS

cago, Illinois, were awarded contract by the U. S. Engineers at Memphis, Tenn., for construction of floodwall improvements at Cairo, Illinois, their bid being $361,592.00.

At the June 25th letting of the Illinois State Highway Dept., contract was awarded to George Welsh Construction Company, Chicago, Illinois, covering concrete runways at Scott Field, Belleville, Illinois, their bid being $464,482.00.

* * * *

Recent Low Bidders in Missouri.—Tobin Quarries Company, Kansas City, Mo., were awarded contract at $2.65 per sq. yd. for 59,056.6 sq. yds. of concrete pavement at Fort Leonard Wood, Mo.

Wm. Crumpecker & Son, Morehouse, Mo., has been recommended for award of contract by the U. S. Engineers, St. Louis, for levee construction work in East Side Levee & Sanitary District, Madison, and St. Clair Counties, their bid being $171,140.

E. A. Brunson Construction Company, St. Louis, Mo., was low bidder at the June 27th letting of the U. S. Engineers, for the construction of an incinerator at Jefferson Barracks, Mo., at $22,772.00.

On bids opened June 27th by the Missouri State Highway Dept., the following were awarded contract:

C. H. Atkinson Paving Company, Chillicothe, Mo., 8.551 miles of 22 ft. concrete paving on Route 71 in Andrew County—$471,836.00.

Feeney Construction Co., St. Joseph, Mo., 0.726 miles of grading, bridge and 22 ft. concrete paving on Route 59 in Buchanan County—$65,487.00.

Atkinson-Windle Co., Chillicothe, Mo., 3.432 miles of grading, 22 ft. concrete paving on Route 61 in Lincoln County—$192,961.00.

Illinois Valley Construction Co., Ottawa, Ill., 5.164 miles of grading, 22 ft. asphalt concrete resurfacing on Route 61 in Pike County—$119,458.00.

Otto W. Knutson, Kansas City, Mo., 4.435 miles of grading, bridge and crushed stone on Route B 652-F in Cass County—$22,948.00.

W. J. Menefee, Sedalia, Mo., 6.786 miles of grading, bridge and gravel on Route A 88-A in Cole County—$62,144.00.

Perry McGlone, Kansas City, Mo., 2.068 miles of grading, 22 ft. concrete paving on Route 40 in Howard County—$207,420.00.

Perry McGlone, Kansas City, Mo., 0.113 miles of grading, 22 ft. concrete paving on Route 40 Boone County—$12,170.00.

E. W. DeWitt and E. B. Cooper, Shelbina, Mo., culverts on Route N Sec. 1A in Osage County—$1,056.00.

Royce Zink, Appleton City, Mo., 3.958 miles of culverts and bridges in Crawford County—$5,205.00.

Concrete Materials & Construction Co., Cedar Rapids, Iowa, 3.841 miles of grading, rolled stone base and bituminous surfacing in St. Charles County—$50,348.00.

Chernus Construction Co., St. Louis, Mo., 0.070 miles of bridge at Wabash Crossing bridge, three 20 ft. concrete slab, on Natural Bridge Road, St. Louis County—$66,843.00.

Chernus Construction Co., St. Louis, Mo., construction of a storm sewer in Brentwood, St. Louis County—$10,851.00.

W. J. Menefee, Sedalia, Mo., 2.746 miles of culverts, bridge surfacing Potosi northwest bridge in Washington County—$5,883.00.

Bridges Asphalt Paving Co., St. Louis, Mo., 10.518 miles of bituminous surfacing on Routes 37 and 44 in Barry County—$65,326.00.

J. M. Roark, Anderson, Mo., 7.660 miles of bituminous surfacing on Routes 60 and 80 in Barry County—$18,826.00.

J. M. Roark, Anderson, Mo., 3.714 miles of bituminous surfacing in Newton County, Route 60—$9,071.00.

Don Pray, Monett, Mo., 6.534 miles of grading bridges, gravel on Route 106 in Shannon County—$20,360.00.

Ray & Son, Louisiana, Mo., 4.393 miles of culverts, bridge and surfacing in Wayne County Route M—$11,483.00.

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Parmanco Drills have convinced owners of their true value—

In the Coal field, the Iron range, the Utility and the Contracting field.

We build a model for every need.

Parmanco Drills are now in their fourth year of successful operations.

WRITE US YOUR DRILLING PROBLEMS

PARIS MANUFACTURING CO., INC.
PARIS, ILLINOIS

PITTSBURGH AREA

Reported by
JOHN W. PATTERSON

Rolling Along with the Music.—Stopping at a construction job in the heat of July we noticed a 5-ton truck, equipped with a first-class radio, pulling on to a construction dump with a load of heavy rock. The truck operator was very busy maneuvering his truck in position while the radio blasted forth modern dance music. We asked the driver, "How come the music? and his answer was forty hours of labor per week, forty hours of music and best of all forty hours of rock at forty yards per hour, or 1600-cu. yds. per truck per week? The truck operator stated he had been on this same job snice early in April and had missed

very few programs. Everything seemed to be in harmony "And the band played on."

* * * * *

Airport Contractors Making Dirt Fly at Johnstown, Penna.—Laub & Collins and Frank Mashuda, the contractors for the airport at Johnstown, Pa., are making excellent progress, and a large number of scrapers, tractors, motor graders, trucks and shovels are rapidly finishing up this large project. It is expected this field will be in operation long before snow flies, and while dirt is flying now in all directions, by late fall large ships from all parts of the country will be, no doubt, landing at this port.

* * * * *

Expansion and How!—Carnegie-Illinois Steel Corporation at Homestead, Penna., is starting immediately a $70,000,000 expansion program. Homestead is one of the largest plants owned by the Steel Corporation. With the $7,000,000 addition, the Homestead plant becomes gigantic.

To make the extension, thousands of residents are moving into other localities. Settlements are being made for properties at the present time and the raising of buildings and grading will begin shortly.

Carnegie - Illinois Steel Corporation is surely going to town on its new extension while the people in the extension district are leaving town for homes and other districts, many to the new Defense Housing Projects and also to the private housing Projects and also to some of the many private housing projects in this district.

* * * * *

The Work Shop of the World.—Practically all of the housing projects in the Pittsburgh District known as the Pittsburgh Housing Authority, Allegheny County Housing Authority and Allegheny County Defense Housing Authority, have their programs well underway. The total grading items in the combined projects are well over 5,000,000 cu. yds. Many private housing projects are also underway in this district. Pittsburgh, "The workshop of the world," is going full speed ahead and its production is rolling off to the assembly lines as never before.

* * * * *

Second-Class Township Roads Get a Break.—The Pennsylvania Legislature have passed Second-class Township Road Appropriation Bill No. 1176 which appropriates $10,000,000 to Township Roads for the next two years. This bill has passed both houses and has been sent to the Governor for his signature.

* * * * *

Westward-Ho.—The great Pennsylvania Turnpike, sometimes called the "Super-Highway," also the "Dream Highway," will soon be extended westward to the Ohio State Line. This 163 miles of four-lane highway with no crossings at grade and where you can make a non-stop drive the whole distance, is going west to Ohio with a by-pass around Pittsburgh, Penna., and it is the hope of many motorists that the State of Ohio will continue the great project still further west. We understand the State of Pennsylvania has passed the extension bill for the highway west through both houses and it has been signed by the Governor. It is hoped that this extension will be completed within the next year and a half.

NEW EQUIPMENT and MATERIALS

Gar Wood Announces Production of New Arm Type Hoist Models

Gar Wood Industries, Inc., Detroit, is now in production of several new arm-type hydraulic hoist models which the manufacturer recommends for installation on 1½ to 2-ton truck chassis and states are especially adaptable for use in connection with dump bodies from 8 feet to 10 feet in length.

The new arm-type hoists are being manufactured in three sizes, D6R, D7R and D7LR. It is claimed these hoists incorporate desirable features and involve a new and exclusive type of lifting arrangement. The lifting effort is reduced considerably, due to the body being lifted further forward than with the conventional arm-type units. The lifting effort which is disseminated

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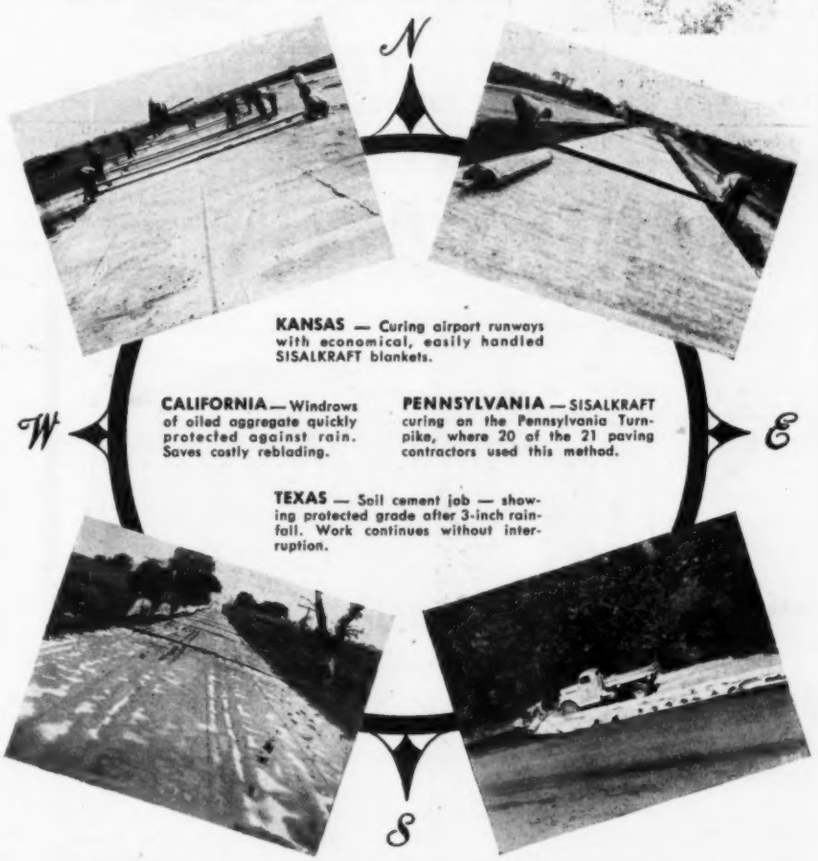
Doing a Great Job for Road Builders from Coast to Coast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KANSAS — Curing airport runways with economical, easily handled SISALKRAFT blankets.
CALIFORNIA — Windrows of oiled aggregate quickly protected against rain. Saves costly reblading.
PENNSYLVANIA — SISALKRAFT curing on the Pennsylvania Turnpike, where 20 of the 21 paving contractors used this method.
TEXAS — Soil cement job — showing protected grade after 3-inch rainfall. Work continues without interruption.

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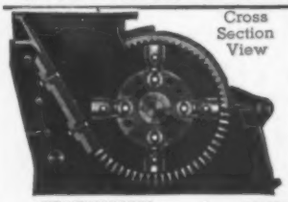
Proper Size Aggregates
when and where you want it *with* Gruendler



Cross Section View

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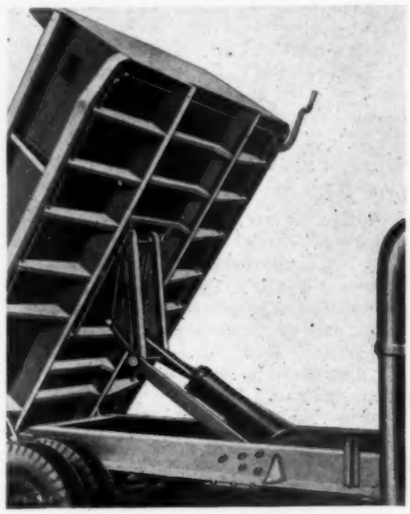
over a greater area, is confined within the self-contained assembly of the hoist unit.

Other features such as minimum stress on body and hinges; minimum stress on truck chassis frame; longer lever arm; fewer working parts; faster operation; minimum



oil pressure; low mounting (when specified) and minimum weight for an arm-type hoist, are referred to in the new Gar Wood bulletin No. 29 which is now being distributed to the trade and which illustrates and describes these new Gar Wood arm-type hoist model.

Power Grader Announced by Austin-Western

The hardest and most rigid requirements of heavy construction and all-season maintenance (including accurate finishing and grading) are easily and fully met by the new, all-wheel drive and steer 99-M, according to the manufacturer.

All wheels are equipped with large diameter tires, equal in size for convenient interchangeability, and all wheels are driven and steered by power. As a result, the 99-M can grade steeper bank and ditch slopes, with a longer blade; and it can offset the frame to distribute power along the entire moldboard to move heavier loads. Other advantages are increased maneuverability and a short turning radius.

Adjustments are all made by hydraulic power control from the cab, including

shifting the blade on its arms; reversing circle; steering front and rear wheels, and raising and lowering blade. When attachments are used, hydraulic power operates scarifier, loader, roller, bulldozer, snow plow and snow wing.

Full information can be obtained by writing to your nearest A-W dealer.

A Knockout Blow!

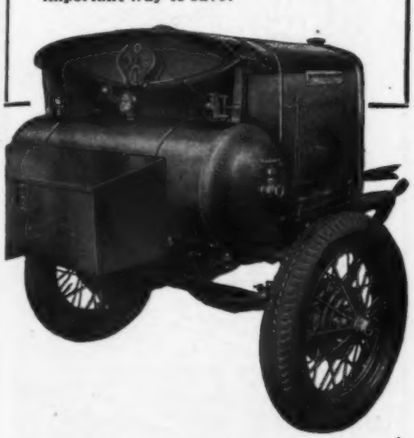
to large, cumbersome compressors on many of your jobs

SMITH AIR COMPRESSORS

are lightweight, sturdy and exceptionally low-priced

Think of the Smith's many advantages on your jobs and, you'll agree it deals a knock-out blow to expensive, heavy compressors in numerous instances.

Move it easily from one job to another. Tow it at permissible truck speeds. Made with FORD MOTORS and standard parts, its ruggedness and efficiency are sources of constant satisfaction to users everywhere. Repairs and parts available at any Ford garage. Priced far below standard compressors of equal capacity. 60 cu. ft. size uses only one gallon of gasoline an hour. Head equipped with high speed compressor valves; automatic unloading and idling. All the power you'll need for a majority of compressor work. Why not take advantage of this important way to save?



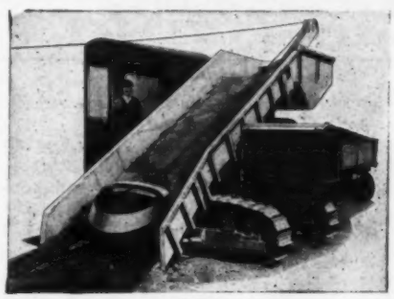
With a Ford Motor and shop facilities you can assemble your own Smith Compressor. We will furnish a Smith Compressor Head and Accessories with complete instructions for mounting.

Write for free booklet

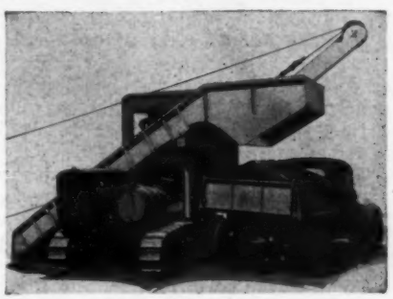
GORDON SMITH & CO.
475 College St. Bowling Green, Ky.

New 1 Cu. Yd. Scraper-Loader

Sauerman Bros., Inc., 488 S. Clinton St., Chicago, Illinois, have produced a crawler-mounted Scraper-Loader of new and interesting design, a unique feature being a hydraulically controlled "teetering" ramp. The machine is equipped with a 1 cu. yd. Crescent scraper bucket. The scraper drag cables are 400 ft. long. The power unit which operates the scraper bucket is a double-drum hoist driven by either a 60 h.p. gasoline or Diesel engine or by a 40 h.p. electric motor. Power is furnished to the crawlers from a take-off on the hoist. In handling loose material from a pit, bank or stockpile 400 ft. wide, this machine will



Rear



Front

Two Views of New 1 cu. yd. Sauerman Scraper-Loader (Diesel Model) Loading Dirt into Truck

load an average of eight 5-ton trucks per hour, assuming that the bucket is so operated as to maintain an average length of haul of about 200 ft. Any reduction in haul brings a proportionate increase in hourly capacity. When moving around a job to a new location, the front of the "teetering" ramp is raised from the ground and held in place by hydraulic rams. Travel speed, throttle-controlled, is 88 f.p.m.

New Portable Lighting Unit

"Nite-Hawk," a new handy, portable floodlight unit easily towed by an auto or small truck, built to give you light "where you want it—when you want it" is now being placed on the market by Lister-Blackstone, Inc., Milwaukee, Wisconsin. It is a fully self-contained source of light and fills the need where power lines are unavailable or where the connection and set-up would be too expensive.

Four 1,000 watt wide-angle floodlights, one on each corner, cast powerful beams in the same or different directions. Each light is individually operated from a control panel and is adjustable up and down, and in all directions. The lights may be

8 DAYS SAVED ON PILING JOB WITH Steel MONOTUBES

• Approximately 1700 Monotubes were driven for this new Orders & Stores Building of the General Electric Co. at Schenectady, N. Y. The piling contractor finished the job 3 days ahead of the regular completion date without using a 5-day time extension which he was entitled to due to bad weather.

How did Monotubes contribute to this 8-day saving? (1) These light, strong steel casings lend themselves to speedy handling. (2) Driving time is reduced because Monotubes require no mandrel and can be driven by standard crawler crane equipment. (3) Every casing can be inspected quickly and thoroughly prior to filling with concrete.

Monotubes are available in gauges, tapers and lengths to meet varying soil conditions—and Union Metal engineers are ready to give you constructive help with your piling problems. Write for Catalog No. 68A.

Architect: Albert Kahn Associated Architects and Engineers, Inc. Detroit, Mich. *Piling Contractor:* Kelly Pile & Foundation Corp., Brooklyn, N. Y.

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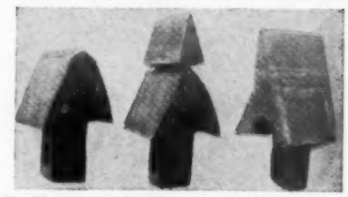

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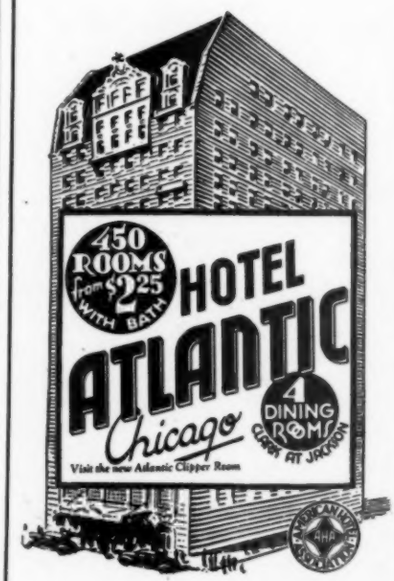
Crushers, Elevators, Sweepers, Screens, Wash Boxes, Bins, Pulverizers, Feeders, Spreaders, Kettles, Conveyors, Drag-Lines, "GAYCO" Centrifugal Air Separators

UNIVERSAL ROAD MACHINERY CO.
Kingston, N. Y.

Canadian Representatives: F. H. Hopkins & Co., Ltd. 340 Canada Cement Co., Montreal, Que., Can.



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MASTER WORKMAN

For Better Roads, put a WORKMAN Machine on the job. 3 sizes:

THE GENERAL • THE SUPER

THE MASTER

YORK MODERN CORPORATION

UNADILLA, NEW YORK

raised to a height of 8½ feet and swung in a 180° vertical arc.

In addition to providing light, this unit has a control panel with receptacles for operating small "Universal" hand tools, such as electric drills, saws and hammers.

Power is supplied by an air-cooled, 14 h.p. Le Roi engine, equipped with an electric starter. A 5,000-Watt self-regulating D.C. generator, connected to the engine, delivers direct current at 110 to 120 volts; the voltage being adjustable by means of a rheostat located on the control panel.

A sheet steel enclosure with hinged side covers houses the entire assembly, including large tool boxes. Louvers at the generator end and an overhead ventilator permit air to escape when the housing is closed.

The "Nite-Hawk" is mounted on heavy-duty, multiple leaf steel springs with two pneumatic-tired wheels. A retractable caster wheel is provided enabling one man to move the unit about the job with ease.

For further information write to Lister-Blackstone, Inc., 1706 South 68th Street, Milwaukee, Wisconsin.

Tell-All Labels Identify Brake Lining Sets

A comprehensive labeling of Brake Lining Sets has been developed by the Gatke Corporation, 228 N. La Salle St., Chicago. These labels give (1) Part number of the set, (2) Number and dimensions of liners, (3) Make, year and model of cars the set fits. These complete labels practically catalog Gatke Brake Lining Sets right on the shelf. Service men can quickly make sure they are getting the correct sets without remembering part numbers or referring to a catalog.

WITH THE MANUFACTURERS

Howard T. Walsh Retires

The Sullivan Machinery Company announces the retirement on pension of Mr. Howard T. Walsh as of June 30, after forty-one years of continuous service. Upon graduation from Worcester Polytechnic Institute, Mr. Walsh joined the company, serving successively as an apprentice in the company's training course, salesman in the

GATKE

BRAKE LINING -- CLUTCH FACINGS FRICTIONS -- Whatever your service is, we have the materials to do the job and will guarantee results. Just send dimensions and tell us what you need.

GATKE CORPORATION, 230 N. LaSalle St., Chicago

A BURCH ON THE JOB

A BURCH FORCE FEED SPREADER on the job will insure an even, uniform stone mat. Specially designed cylinder will eliminate corrugating, dual feed gate control gives a wide range of adjustment to the flow of material. The machine is operated by the movement of the truck forward or backward.

Manufactured by

The BURCH CORPORATION

Crestline, Ohio

Builders of equipment for Fifty Years

SNOGO
For Complete Snow Removal
ELIMINATES dangerous one way bottlenecks. Reduces expensive repeat plowing. Reduces snow damage to roads, and cuts resulting road repair. Plan now for real snow removal next winter.
Klauer Manufacturing Co.
DUBUQUE, IOWA

Denver territory, Pacific Coast manager, London manager, general sales manager, vice-president and director.

Ransome Appoints New Representative in Virginia

The Ransome Concrete Machinery Company, Dunellen, New Jersey, has appointed The Highway Machinery and Supply Company, Inc., 1724 Altamont Avenue, Richmond, Virginia, as their exclusive distributor in the State of Virginia, to handle their complete line of construction equipment.

MacArthur, Link-Belt Secretary, Retires

F. V. MacArthur

H. E. Kellogg

Announcement is made by Link-Belt Company, Chicago, that Mr. F. V. MacArthur, after nearly fifty years of service, has resigned as secretary and assistant treasurer of the company, and is retiring from business.

Mr. Harry E. Kellogg, treasurer and assistant secretary, has been elected secretary, thus becoming secretary and treasurer.

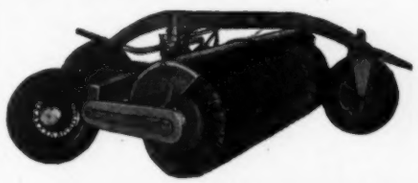
Mr. Melbourne P. Anderson, formerly general accountant, has been appointed assistant treasurer, and Mr. Henry C. Oakes, statistician, to the position of assistant secretary.

Mr. Frank H. Brandt, until now accountant of the company's Pershing Road Chicago plant, has been appointed general auditor in charge of the accounting of the company.

President, Shafer Bearing Corporation Now Captain, U. S. Army Air Corps

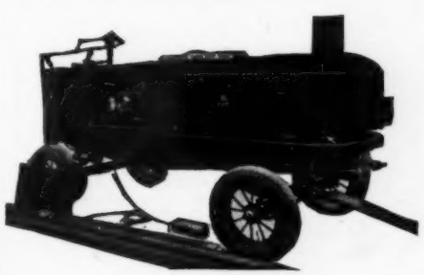
M. J. Tennes, Jr., President, Shafer Bearing Corporation, effective July 5th has entered active service as Captain in the United States Army Air Corps with permanent station at the Air Corps Advanced Flying School, Phoenix, Ariz.

GRACE



2-WAY AXLE DRIVEN SWEEPER

RAPID FIRE HEATER



- ***Grace 2-Way Axle Driven Sweeper***—the modern traction driven sweeper that successfully meets the sweeping problem of any contractor.
- ***Rapid Fire Heater***—A fast-pumping, fast-heat circulating heater that heats 10,000-gallon insulated cars at 40-50° per hour. Write for information and prices.

W. E. GRACE MFG. CO. 6000 Holmes St. DALLAS

CUT MOWING COSTS

With SILVER KING

Do fast, economical mowing on the level or in the rough with Silver King, the mowing unit that's ENGINEERED for the job. Write for details.

THE FATE-ROOT-HEATH CO.
Plymouth, Ohio

The Favorite Mowing Unit for City, County and State Highway Departments

DIRT MOVING EQUIPMENT

Highway construction involves more dirt moving than any other branch of engineering construction. ROADS AND STREETS, the only national engineering construction magazine devoted exclusively to, and covering all sections of, the highway field is the most effective and economical medium through which to sell dirt excavating, grading and hauling equipment.

CLEARING HOUSE

FOR SALE

1—35 ton Fruehauf Trailer	$ 300
1—Lakewood Finishing Machine (like new)	1200
1—P&H Skimmer (Excellent Condition)	3500
1—Keystone Skimmer with 2 extra ditching hoes (Gas Power)	1000
1—15 ton 3 wheel gas roller	300
1—P&H Crane with 1 yard clam shell bucket	1500
1—Steel Hopper with 2 five yard compartments	200
3—Gasoline road axes for cutting concrete (new)	150
1—5 ton Mack Dump Truck on pneumatics	1100
7—2½ ton Mack Dump Trucks on solids with batch bins, each	500

This equipment is all in very good condition and has been stored in a good dry brick building.

MANSON L. REICHERT
320 Monroe Ave., Evansville, Indiana
All prices F.O.B. Evansville, Indiana.

EQUIPMENT FOR SALE

TRACTORS

Cletrac "DDH" Hillside Model Tractor No. 1-L-3082 with Hercules Diesel 61 H.P. motor, 18" tracks, overhauled and in very good condition.
Cat. "60" Tractor in operating condition.

EARTH HANDLING EQUIPMENT

Austin-Western 5 yard cable scraper, good condition.
Austin-Western winch for above scraper, to fit any standard crawler tractor.
Ateco 5 yard scraper with hydraulic attachments for Cat. "60". Good condition.
Ball Wagon, 3 yard, working condition.
Page ⅜ yard dragline bucket complete, reconditioned and in excellent condition. Painted red.
Austin Western 30 Ft. crane boom for Badger Shovel with fairleads in good condition. Painted red.

GRADERS

Ryan 12 Ft. Grader, power controlled, leaning frame, steel tired roller bearing wheels, in operating condition.
Adams 8 ft. Grader with good solid rubber tires, roller bearing wheels, painted yellow. Good condition.

CRUSHING EQUIPMENT

Simplicity 2 deck screen, 3' x 6' without screen cloth, painted gray, excellent condition.
Niagara 2 deck 3' x 8' screen with 1" and 1¼" cloth on top deck, ¼" screen cloth on bottom deck. Rebuilt with new bearings. Excellent condition.
Austin-Western 32" x 14' revolving screen with 4 ft. sand jacket. Will be rebuilt and sold with guarantee.
Manistee 6" centrifugal pump, high head, triple stage, capacity 600 gal. per minute at 150 ft. head. Mounted on steel skids with factory rebuilt Hercules 50 H.P. motor, 4 cyl. Painted red and in excellent condition.
Waukesha 4 cyl. 40 H. P. Power unit complete with clutch, 10" pulley with Gates No. 210-C "V" belts. Painted yellow, very good condition.
LeRoi 4 cyl. Power unit on skids, Motor No. 80095, with 2 to 1 reduction gear and clutch, hood sides. No pulley. Painted yellow. In new condition.
No. 105 Austin Gyratory Crusher with back gear on steel tired trucks. Excellent condition.

TELFORD EQUIPMENT CO.
735 E. Kalamazoo St., Lansing, Michigan

FOR SALE

CLAMSHELL BUCKETS, ⅛ to ¾ yard.
CRANE BOOM, 40 ft. lattice type, in good condition. For Model 3 and 5 Northwest machines.
CRANE-DRAGLINE, Northwest ¾ yd. with 40 ft. boom.
CRANE-DRAGLINE, Northwest Model 6 (1½ yd.) with 60 ft. boom, gantry and live boom hoist.
CRUSHER, Cedar Rapids 9 x 36 plain bearing, in good condition.
DRILL SHARPENER, Sullivan Class C.
PAVER, 13E (½ yd.) Koehring on full crawlers, 20 ft. boom and bucket, good condition.
PILE HAMMERS, No. 3 Vulcan and No. 7 McKiernan-Terry.
SCALE, Winslow 12 ton truck scale.
SCRAPER, 5 yd. Austin-Western cable scraper, with winch and power take-off.
SHOVEL, ¾ yd. INSLEY.
SHOVEL, Koehring Model 401 (1¼ yd.).
SHOVEL, ¾ yd. Insley, in operating condition.
WAGON DRILLS (6), Cleveland DR-8 (latest model) Universal Drill Rigs, with recoil device, for depth of 25 to 30 ft. change, mounted on three rubber tires; with D-14 DR Cleveland drifter; recommended for use with 260 ft. or 315 ft. compressor. In excellent condition.

Write for our complete list

O. B. AVERY COMPANY
1325 Macklind Avenue St. Louis, Missouri

Changes in Goodrich Organization

Three important appointments in the executive staff of the tire division of The B. F. Goodrich Company, Akron, Ohio, are announced by T. G. Graham, vice-president in charge of factory operations.

K. D. Smith, the division's technical superintendent for the past nine years and nationally known as an authority on tire design and construction, has been named assistant to Mr. Graham representing his office on special technical assignments.

Concurrent with the appointment of Mr. Smith, the B. F. Goodrich executive named A. W. Phillips as general superintendent of the division, and Harold Gray to assume the post of technical superintendent.

Advance for Herbert J. Watt

Carnegie-Illinois Steel Corporation announced the recent appointment of Herbert J. Watt as manager of sales for the western area. Mr. Watt will coordinate sales activities of Carnegie-Illinois offices at Chicago, Denver, Detroit, Indianapolis, Milwaukee, St. Louis, and St. Paul. His headquarters will be established at the Corporation's Chicago office.

Herbert J. Watt

Mr. Watt began his steel industry experience at the Philadelphia office of the Carnegie Steel Company in 1912. In December 1939 he was appointed manager of sales for the central area of Carnegie-Illinois Steel Corporation, the position he has held until the present time.

Chain Belt Company Makes New Appointments

Chain Belt Company of Milwaukee has just announced that Mr. J. Walter Snavely, district manager in the Houston territory for seven years, has returned to the Sales Department of the Conveying and Engineering Products Division at Milwaukee. Mr. Snavely graduated from the University of Wisconsin and entered the employ of Chain Belt Company in the year 1927.

Mr. W. A. Pitts, formerly representative in Oklahoma City, has been appointed district manager of oil well sales at Houston. Mr. Pitts has worked in practically every oil field in the Mid Continent and Gulf Coast area for the past twenty years. From 1926 to 1934 he was also in the oil fields in California.

Mr. George Hunt has been appointed district manager of industrial sales with headquarters at Dallas, Texas. Previous to his joining Chain Belt Company organization, Mr. Hunt was an engineer for one of the largest paper mills in the South.

New Buckeye Distributors

The Buckeye Traction Ditcher Co., Findlay, Ohio, announces the appointment of the following dealers to handle Buckeye

CLEARING HOUSE

TRANSITS and LEVELS

New or Rebuilt
Sale or Rent

Headquarters for REPAIRS — any make. Factory Service. We will also *buy* your old instruments or take them in *trade*.

A complete line of Engineering Instruments and Equipment for Field or Office. Write for Bulletin RS 68.

WARREN-KNIGHT CO.
Manufacturers of Sterling Transits and Levels
136 N. 12th St. Philadelphia, Penna.

EQUIPMENT FOR SALE

2—Allis-Chalmers Model L Tractors.
1—Allis-Chalmers Model "42" Motor Graler.
2—Gar Wood, Model L-10, Hydraulic Scrapers.
1—Springfield 10 Ton Road Roller.
1—Lorain Model "75-B" Shovel.
1—Caterpillar Road Grader.
1—Allis-Chalmers Road Grader.
1—Gallion Road Grader.

All in serviceable condition

SPENCER CONSTRUCTION CO.
CARROLLTON, TEXAS

REBUILT READY FOR IMMEDIATE SHIPMENT

All Located at Pittsburgh, Penna.

1—Lorain 75-A Gasoline Shovel 1¼-yd. dipper.
2—Austin-Western 10-ton Autocrat Rollers.
2—Austin-Western 99 Motor Graders, diesel driven.
1—IHC PD80 International Diesel Engine.
1—Austin-Western 12-yard Scraper.
1—15x20 Austin-Western Jaw Crusher.
1—No. 3 Keystone Ditcher with three backhoe ½-yd. buckets and one skimmer scoop, gasoline powered; buckets 30" width.

JOHN W. PATTERSON CO.
324 Fourth Ave. Pittsburgh, Penna.
Phone Court 1256

SPECIALIZED SERVICES

TIRES REPAIRED

18.00x24 down to wheelbarrow size. Full line of new and used tires.

WALLACE TIRE SERVICE, Inc.
2329 S. Michigan Ave. Chicago, Ill.

FOR SALE OR RENT

Rebuilt Lorain 1¼ Yard 75A Gas Shovel

PETRIE MACHINERY CO.
Billings, Montana

CLEARING HOUSE

Hall-Perry Machinery Co.
812 E. Iron St.
BUTTE, MONTANA
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EQUIPMENT AND SUPPLIES FOR:
Contractors
Mines
Mills
Municipalities
We will be glad to figure on equipment and supplies for any job.

FOR SALE:
30 x 10 Portable CRUSHING PLANT
4 x 8 Telsmith Vibrating SCREEN
1 Ton Cap. ASPHALT PLANT
3—800 x 1,000 Gal. DISTRIBUTORS
18 in. x 200 ft. BELT CONVEYOR
5—RD-6, 7, 8 DIESEL TRACTORS
½ yd. Owen CLAMSHELL
10 Ton Tandem ROLLER
2—1,000 ft. DIESEL AIR COMPRESSORS
30—1½ yd. and 3 yd. DUMP CARS
6 ORANGE PEELS—6 to 27 ft.
100 H.P. Lambert three drum ELEC. HOIST
5 Parsons & Cleveland TRENCHERS
2—2½ and 3 ton tandem gas ROLLERS
Tidewater Equipment & Machy. Corp.
305 Madison Ave. New York, N. Y.

FOR SALE OR RENT
HEAVY GRADING EQUIPMENT
1—Model RO 54 AC speed patrol grader.
1—Model 10-K Ryan pull grader.
1—No. 14 AC power controlled pull grader.
1—10-ton Huber roller, gas engine power.
1—10-ton Buffalo steam roller.
1—4 to 5 yard Ateco hydraulic scraper.
1—Model L tractor.
1—Model LO Allis-Chalmers tractor.
1—Model K Allis-Chalmers tractor with dozer.
USED TRACTOR PARTS
Large assortment parts for Models L and LO Allis-Chalmers and 60 and 65 Caterpillar, including transmissions, gears, sprockets and motors.
Write for our complete used equipment list
GENERAL MACHINERY COMPANY
SPOKANE, WASHINGTON

FOR SALE
15 x 25 Diamond crushing plant. Crusher, rolls, screens, conveyors all mounted on one truck, all roller bearings. Price $4,500.
M. O. MONSON, South Wayne, Wis.

WANTED—One ⅝ or ¾ yd. caterpillar mounted gasoline crane: One 110' to 120' Portable Air Compressor: One 6- x 8" small jaw crusher on skids: Give condition, price, and where can be inspected. **Address, Box 432, Ronds and Street, 330 So. Wells St., Chicago, Ill.**

WANTED—Second-hand Model D8 Caterpillar Diesel tractor, any condition. **Box 433, Roads & Streets, 330 So. Wells St., Chicago, Ill.**

Unitilt Bulldozers and Trailbuilders, Buckeye Rigid Type Bulldozers and Buckeye Power Control Units for Allis-Chalmers Tractors: the Southern Ohio Equipment Co., Zanesville, Ohio, and the Lakeshore Machinery & Supply Co., Muskegon, Mich.

Construction Unit a New Division of U. S. Bureau of Foreign and Domestic Commerce

The appointment of S. Morris Livingston, previously economist for the Investment Counsel firm of Scudder, Stevens and Clark, as Chief of the new Construction Unit in the Bureau of Foreign and Domestic Commerce was announced by Carroll L. Wilson, Director of the Bureau.

Mr. Livingston has had many years of practical experience in analyzing special construction problems and interpreting general business conditions as they affect the current operations and future outlook of the construction industry.

Joseph H. Ehlers, a Construction Engineer of wide experience, recently associated with Modjeski & Masters, Consulting Engineers, has been retained as Technical Specialist. Mr. Ehlers served for several years as Liaison Officer of the Public Works Administration.

While the organization of the unit has been contemplated for several months, its establishment at this time was prompted by a very evident need for a more complete and detailed analysis of current conditions in the construction industry.

The new unit will develop, cooperatively with other Government agencies and with industry, a broad picture of all construction activities particularly as needed by the National Income and Commodity sections of the Bureau. It will also offer assistance to trade associations and others in the construction field in their current operating problems.

NEW TRADE LITERATURE

Tractor Wheel Rims.—A 4-page bulletin has been issued recently by Alloy Steel & Metals Co., 1862 E. 55th Street, Los Angeles, Calif., which describes their process of rebuilding wheel runs for tractor drive sprockets and idler wheels with manganese steel. The manufacturers claim that substantial savings can be made through the use of their service. When writing Alloy Steel & Metals Co. ask for Bulletin 115.

Land-Clearing Tools.—A new booklet on Land Clearing, twelve pages in two colors, has just been released by the LaPlant-Choate Manufacturing Co., Inc.

The booklet features a section devoted to the King Ranch in Texas, a 900,000 acre ranch where extensive land clearing is practiced, using modern methods and machinery. Reasons for clearing are explained in detail—especially emphasized are the increased value of the land and the improvement possible, with regard to livestock.

Other land clearing projects, such as highways, reservoirs, airports, and so forth are also described and illustrated. Methods and equipment are explained.

Mine, Pit and Quarry Machinery.—The Smith Engineering Works has just issued a new catalog (Telsmith Bulletin No. 266M) that is available upon request.

CLEARING HOUSE

EQUIPMENT FOR SALE

FOR SALE—One 15 x 20 Austin-Western Crushing Plant, mounted roller bearing wheels—International Diesel Engine, 20 ft. elevator, first-class condition at bargain. **DIXIE CULVERT MFG. CO., 1601 East 9th St., Little Rock, Ark.**

FOR SALE—Caterpillar tractors, excellent rebuilt condition: 50 diesel, 60 and 22 gas. Koehring Dandie Concrete mixer, 10S. 2 12-foot motor graders. **Clifford Waterhouse, P. O. Box No. 172, Jackson, Mississippi. Phone 2-0617.**

FOR SALE—1—Model 522 BARBER-GREENE Bucket Loader, on 2 pneumatic tires; belt conveyor discharge; 1 cu. yd. per minute capacity; almost new, traded in on larger loader; located in Central Kansas. **Address, Box 429, Roads and Streets, 330 So. Wells St., Chicago, Ill.**

FOR SALE—1—7S KOEHRING DANDY Concrete Mixer with side loader and water tank; mounted on 4 steel wheels, good used condition; located in Northwest Missouri. **Address, Box 430, Roads and Streets, 330 So. Wells St., Chicago, Ill.**

FOR SALE—1—27E REX PAVER with boom and bucket; mechanical man; caterpillar mounted; gasoline engine; good used machine; This is a bargain: located in South Missouri. **Address, Box 431, Roads and Streets, 330 So. Wells St., Chicago, Ill.**

FOR SALE—1¼ yd. Lorain 75A cat. shovel with extra 50 ft. crane boom good condition.
20-25 foot finishing machine with or without vibratory attachments.
FRANK McCAFFREY
35 Arlington Ave., Niles, Ohio

FOR RENT OR SALE—2 new 12' L.P. LeTourneau Scrapers with 1 brand new D8 and used "75" cat tractors. Also paving equipment, compressors, Adnum spreader. Practically every other type of equipment a contractor uses. **Box 519, Road and Streets, 330 So. Wells St., Chicago, Ill.**

POSITION WANTED—Construction Supt. Over 20 years experience in road building all types—both highway and city—grading, culverts, drainage, catch basins, manholes, curb, curb and gutter. Everything pertaining to road building construction. **Box 436, Roads and Streets, 330 So. Wells St., Chicago, Ill.**

GENERAL MANAGER — Forceful, capable executive, twenty years experience in construction of all types roads, bridges, sewers, etc., seeks position as general manager for contracting firm. Expert in the preparation of bids, contracts, purchasing, organization and control of heavy construction projects. Ideal man for bank or heirs. Willing to work on percentage basis. Available on short notice, willing to go anywhere. **Box 435, Roads and Streets, 330 So. Wells St., Chicago, Ill.**

POSITION WANTED—Experienced operator and service man on all types of road machinery. 16 years experience. Married with family. Draft exempt. Prefer work in Missouri but would go anywhere. Can furnish good references. **Box 434, Roads and Streets, 330 So. Wells St., Chicago, Ill.**

A BIG CONTRACTOR REPORTS: "When it comes to excavating work, our Williams Bucket surely digs. We don't believe better buckets are built."

You'll say so too, once you use a Williams Bucket.

Williams Buckets and Parts are carried by distributors in all parts of the country. Bulletins covering Williams Power Arm, Multiple Rope, and Dragline Buckets sent on request.

THE WELLMAN ENGINEERING CO.
7003 Central Avenue
Cleveland, Ohio

WILLIAMS *Buckets*
built by WELLMAN

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